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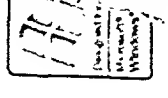

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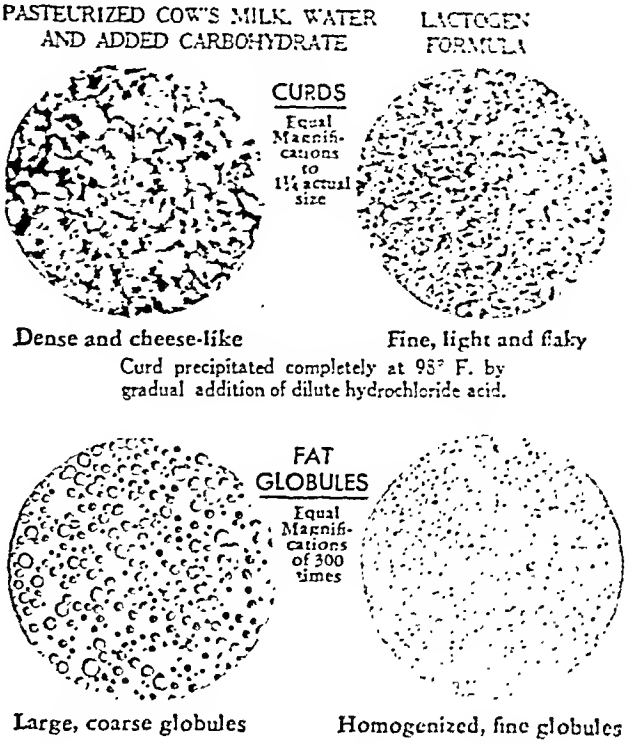

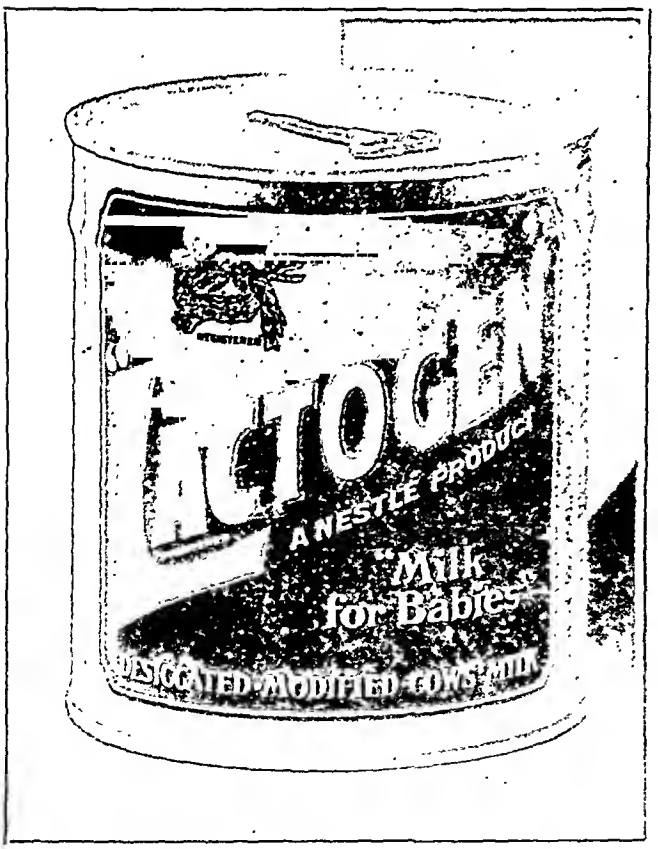

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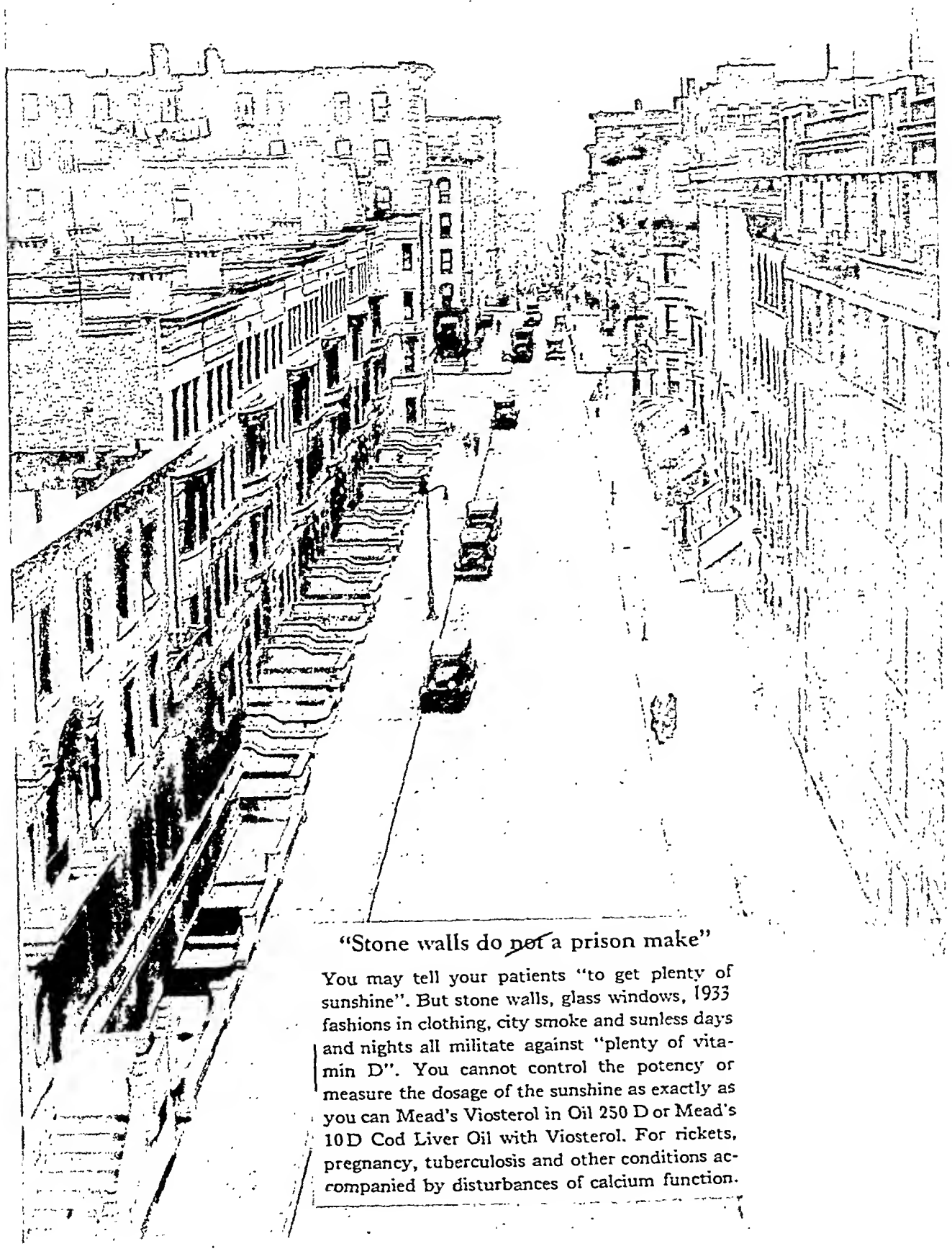

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THE TREATMENT OF PERNICIOUS ANÆMIA BY THE INTRAMUSCULAR ADMINISTRATION OF LIVER EXTRACT

BY E. W. MCHENRY *(Connaught Laboratories, University of Toronto)*, E. S. MILLS *(Montreal General Hospital)* AND R. F. FARQUHARSON *(Toronto General Hospital)*

PART 1

PREPARATION OF LIVER EXTRACT FOR INTRAMUSCULAR USE *(E. W. McHenry)*

SHORTLY after the announcement by the Harvard workers of the effectiveness of a liver diet in the treatment of pernicious anæmia, intensive studies were made in several laboratories in an endeavour to isolate the active substance. Cohn and his associates[1] prepared several active fractions from liver, among them the "G" fraction which has been used clinically for four years, generally in the form of a powder for oral administration. Later Cohn[2] was able to secure a highly purified fraction, "IE", which was free from the depressor substances always present in "G". It was found that the "IE" fraction could be safely given intravenously with good results. Six hundred milligrams of this active substance administered by this route gave a marked increase in reticulocytes. West *et al.*[3] also prepared purified materials which were given intravenously and proved effective in small doses. The processes by which these purified fractions were obtained were laborious, expensive, and therefore unsuitable for the routine preparation of material for clinical use. During the various stages of purification a great deal of the active factor was lost. In one case, for example, West and Howe[3] described an active substance of which 680 milligrams given intravenously produced a marked response. This amount had been prepared from approximately 60,000 grm. of liver.

In 1930 Gänssler[4] published a report of cases successfully treated by injecting intravenously small amounts of a liver extract, the preparation of which was not described. The following year, Castle and Taylor[5] outlined a simple method for obtaining a solution from fraction "G" (commercial liver extract powder) which was intended for intravenous use. This solution contained substances, presumably histamine and choline, which caused a transitory fall in blood pressure. Later in the same year Strauss, Taylor and Castle[6] stated that one-third of their cases treated by intravenous injection suffered from unpleasant reactions as a result of the administration of depressor substances. Accordingly, they described the preparation of a solution for intramuscular injection. Results of treatment by this route were entirely comparable in rapidity and magnitude to those secured by intravenous treatment, and no unpleasant symptoms developed. Recently several reports have appeared (Murphy;[7] Wilkinson;[8] Connery and Goldwater[9]), in which results of treatment by intramuscular injection of solutions prepared by a method somewhat similar to Castle's have been given.

The process employed in the Connaught Laboratories is essentially that described by Strauss, Taylor and Castle.

The dry powder from a known weight of liver, prepared as described by McHenry, MacLean and Best,[10] is mixed thoroughly with distilled water and heated carefully to 70° C. mixture is nd, while cooling, tricresol is ary to give 0.3 per cent in th lution. is buffered with sodium dih osphat adjusted to 7.2 by addit hy on. Th volume is incre an a h cc centimetre cont i f ight liver. The mix red tor two days, durin a

This is removed by filtration through Whatman No. 50 paper. The precipitate is discarded. The solution is sterilized by passage through a Berkefeld candle and filled into rubber-capped vials. Generally the strength of the solution is such that each cubic centimetre contains the extract prepared from five grams of liver. For clinical trials solutions of double and quadruple this concentration have also been prepared.

As a precautionary measure injections of solution from each lot have been given subcutaneously to laboratory animals and intramuscularly to human volunteers. Physiological assays have also been made of the depressor substances contained in each lot by measurements of blood-pressure changes in etherized cats. The depressor-value of the solutions, calculated in terms of milligrams of histamine per cubic centimetre of solution, ranges from 0.004 to 0.03, the higher values being for the concentrated solutions. Extracts thus prepared are practically free from protein. Experiments by graduate students under Dr. D. T. Fraser's direction have indicated that the solutions do not sensitize guinea-pigs. Nevertheless, it must be pointed out that these extracts are not recommended for intravenous or subcutaneous use, because of the depressor-content.

PART 2

CLINICAL RESULTS AT MONTREAL GENERAL HOSPITAL *(E. S. Mills)**

The potency of the liver extract for intramuscular use developed in the Connaught Laboratories has been tested simultaneously, though independently, at the Toronto General and the Montreal General Hospitals. The present section of the paper deals entirely with the clinical results in Montreal. The section which follows is a discussion of the results in Toronto. The conclusions which may be drawn from these results in both centres are in such accord as to warrant one general statement in regard to the clinical use of the extract. Four different extracts have been tested. The first three had been prepared in such a way that one cubic centimetre contained the active principle from five grams of liver. The fourth, RS-I, was twice this concentration. In all, 11 cases of pernicious anæmia have been treated by means of these extracts. The relevant features of these cases and the effect of the extract used are briefly outlined in Table I and Charts I and II. Before proceeding to a discussion of these, however, a word or two on technique seems advisable.

Hæmatological technique.—Reticulocyte counts were done daily by the one observer and frequently checked by a second. An approved supravital technique was employed. Erythrocyte counts and hæmoglobin estimations were made every second day until the reticuloeyte response occurred, after which they were done at least once a week. The hæmocytometer was a standardized instrument and the Hellige hæmoglobinometer was checked by the oxygen-capacity method of Van Slyke.

The management of patients.—All patients while under study were hospitalized, kept in bed, and given an ordinary ward diet without liver. With one exception no case had received liver or liver extract for at least a month prior to hospitalization and no case received other anti-anæmic treatment during the clinical trial.

Technique of injection.—The extract was always administered intramuscularly. In all cases it was injected into the gluteal muscles, using the site and technique commonly recommended for the intramuscular administration of bismuth and mercurial preparations. A needle of somewhat smaller bore may be used, however. No harmful systemic effects followed the injections. If the extract was given well into the muscle there was usually some immediate pain, which could be reduced to a minimum by injecting the material slowly. Some soreness commonly remained for a few hours. The amount of immediate pain and soreness afterwards varied with the quantity injected. As much as 10 c.c. has been injected into each gluteal region without much local reaction. However, should the material be injected into the subcutaneous tissues a localized abscess may follow, as in one case in our experience.

The frequency of administration.—Two methods of giving liver extract for intramuscular use were utilized. The one consisted in the daily administration of a small quantity of extract, and the other, the injection of much larger amounts at longer intervals of time. Each method has its advantages, but the clinical results from any given amount of extract are identical, whether from frequent small doses or one large one. The larger

* From the Department of Medicine of McGill University and the Medical Service of Dr. C. P. Howard, Montreal General Hospital.

weekly injections must be given into the buttock, and therefore cannot be administered by the patient, whereas the smaller quantities may be injected by the patient himself. The question of expense and availability of the physician may be determining factors.

EVALUATION OF RESULTS

The proof of the potency of liver or liver extract depends upon its ability to restore the blood of the patient to the normal values in a reasonable period of time. For practical purposes this information can be obtained within the first week of treatment by observing the degree of reticulocytosis which follows the injection and comparing it with theoretical values. The maximal theoretical reticulocyte response for any given case was estimated according to the well-known formula: E r –

TABLE I.

Case	Age Sex	Before treatment		Day of reticulocyte peak	Reticulocyte percentage	Actual reticulocytes (thousands)	Calculated reticulocytes	Discharge count		Days on treatment	Red blood cells per day	Extract number	Frequency of dosage Remarks
		Hb.	Red blood cells					Hb.	Red blood cells				
1. J. W.	F. 69	19	0.98	10	4.9	49	534	22	1.0	12	...	R2	3 c.c daily equiv. 15 grm. liver.
"		22	1.00	4	6.8	68	530	24	1.0	21		R2	6 c.c. daily equiv. 30 grm. liver.
2. S. N.	M. 59	23	0.80	5	31.7	317	570	55	3.12	21	0.110	R2	30 c.c. daily equiv. 150 grm. liver.
3. F. B.	F. 49	34	1.27	5	24.0	420	476	62	2.79	18	0.085	R5	2 c.c. daily equiv. 10 grm. liver. Gluteal abscess.
4. J. S.	F. 83	62	2.90	8	13.0	416	150	89	4.60	21	0.081	R5	2 c.c. daily equiv. 10 grm. liver. Received oral liver extract before injection.
5. T. F.	F. 58	77	2.88	5	4.5	148	154	90	3.78	21	0.043	R6	Single dose 10 c.c. equiv. 50 grm. of liver. Admitted for coronary thrombosis.
6. O. T.	F. 57	70	2.38	5	12.7	361	254	95	4.10	20	0.086	R6	Single dose 20 c.c. equiv. 100 grm. liver.
7. E. L.	M. 42	44	1.76	6	16.4	505	378	79	3.88	16	0.130	R6	Single dose 30 c.c. equiv. 150 grm. liver.
8. J. B.	M. 56	47	1.54	7	26.8	458	422	84	3.95	45	0.054	R8-1	Single dose of 5 c.c. equiv. 50 grm liver. Repeated on 15th and 23rd day.
9. A. S.	M. 61	44	2.11	6	26.5	670	308	75	3.80	27	0.063	R8-1	Single dose of 5 c.c. equiv. 50 grm. liver. Repeated on 19th day then raw liver.
10. F. M.	M. 56	72	2.69	6	11.0	423	192	85	3.85	8	0.140	R8-1	Single dose 10 c.c. equiv. 100 grm. liver.
11. J. W.	M. 38	80	3.51	6	6.7	231	40	105	4.47	28	0.035	R8-1	Single dose 10 c.c. equiv. 100 grm. liver. Repeated on 14th day.

centration was used. The results, presented in Tables II and III, indicate that the effectiveness of these preparations varied according to the amount of liver extract administered, irrespective of its dilution, and that no active principle was lost by preparing it in greater concentration. The stronger preparation was not found to be more irritating, and was preferable when large doses were to be given, because of its smaller volume.

The size and frequency of dosage.—Reaction.—About half the patients were given daily intramuscular injections, the volume varying from 2 to 4 c.c. containing the extract derived from 10 to 30 grm. of liver. To some it was given every three or four days; to others, once a week. One patient was given a single dose of 30 c.c. of the weaker preparation, and, when the effect had disappeared, 30 c.c. of the stronger preparation. Smaller quantities were injected into the deltoid, triceps, pectorals, muscles of the thigh and buttocks without any marked reaction. The larger quantities were given only into the buttock. When large amounts were given the patient might complain of mild pain and stiffness lasting for twenty-four to thirty-six hours after the injection. One patient has been given weekly injections of 10 c.c. of the stronger preparation (1 c.c. containing the extract derived from 10 grm. liver) for more than six months. He comes to the hospital, is given the extract intramuscularly, and walks home with only mild discomfort. He frequently protests his great preference for intramuscular therapy.

Unfavourable reactions.—Only one patient had unfavourable general reactions. On the day after the injection of the extract from 120 grm. liver, on two occasions his temperature rose to 101° and 103°, respectively, and he suffered mild general malaise. He was, therefore, given no further intramuscular therapy. In another patient receiving 10 c.c. liver extract per week, an abscess developed in the buttock. Following this early case great care was taken to be sure that all the extract was injected into the muscle.

Routine and methods.—With the exception of cases 2 and 22, all patients were treated in hospital in bed on ordinary diet without liver and without other medication.* In no case had liver therapy been given for at least two months preceding the use of the intramuscular extracts, although eight of the patients had had previous

* Patient 14 was given alkalies in treatment of acute pyelitis.

TABLE II.

RESULTS OF TREATMENT WITH EXTRACTS OF STRENGTH THAT 1 C.C. CONTAINS THE EXTRACT FROM 5 GRM. LIVER

Case No.	Age Sex	Before treatment		Highest Retic.		After 1 month		Extract No.	Average dose per day: grm. liver	Frequency of dosage and remarks
		Hb.	R.B.C.	Per cent	Day	Hb.	R.B.C.			
1. F. R.	M. 62	31 49	1.2 1.7	4 22	10th 7th	49 83	1.7 (2 wk.) 4.2	R3-2* R3-2	10 20	2 c.c. daily for 2 weeks, then 4 c.c. daily for 1 month.
2. A. D.	M. 38	30	1.3	8	5th	40	1.6 (18 dy.)	R3-2	10	2 c.c. daily: treatment continued for only 10 days. See Chart III.
3. R. W.	F. 62	50	1.9	9.8	9th	75	3.7	R3-2	15	3 c.c. daily. (4 c.c. daily + ⅓ lb. liver by mouth subsequent 3 wk. without appreciable change in Hb. and R.B.C.)
4. E. G.	F. 42	30	1.0	27	7th	78	4.3	R3-2	20	4 c.c. daily. S.C.D.**
5. A. M.	F. 58	45	1.9	17	10th	70	3.0	R3-2	10.7	15 c.c. once a week.
6. H. J.	M. 61	68	2.5	46	8th	88	5.0	R6-3	10	2 c.c. daily, S.C.D.
7. D. L.	F. 58	40	1.5	20	8th	78	4.1 (3 wks.)	R6-3	10	2 c.c. daily for only 3 weeks.
8. A. G.	M. 63	50	2.6	15	6th			R3-2		Single injection of 30 c.c. See Chart IV. S.C.D. Patient had erysipelas.

*It is possible that extract R3-2 was less potent than extract R6-3.

**In this Table as in Table III the letters S.C.D. are used to indicate patients who suffered from subacute combined degeneration of the cord.

liver treatment. All of these had ceased to take any form of liver, usually for many months before admission to hospital. All but three patients (cases 2, 7 and 18) were treated with extract intramuscularly for at least one month, and three have been carried on with the extract from 100 grm. once a week for a period of from five to eight months.

A summary of the results of the first month's treatment is tabulated in Tables II and III. In Table II are given data obtained from patients treated with an extract of such concentration that 1 c.c. contains the extract from 5 grm. of liver, and in Table III from patients treated with an extract of which 1 c.c. contains the extract derived from 10 grm. of liver. The immediate response may be judged by the peak of reticulocyte crises. Occasionally this is lower than might be expected due to the influence of such factors as infection (case 14) and possibly arteriosclerosis (case 17). Such low reticulocyte responses may, however, be followed by fairly satisfactory improvement in the blood picture and clinical condition of the patient. It is this final effect by which the actual value of the therapy must be judged.

TABLE III.

RESULTS OF TREATMENT WITH EXTRACTS OF STRENGTH THAT 1 C.C. CONTAINS THE EXTRACT FROM 10 GRM. LIVER

Case No.	*Age Sex*	*Before treatment*		*Highest Retic.*		*After 1 month*		*Extract No.*	*Average dose per day: grm. liver*	*Frequency of dosage and remarks*
		Hb.	*R.B.C.*	*Per cent*	*Day*	*Hb.*	*R.B.C.*			
9. J. B.	F. 51	55	2.0	12.6	10th	69	3.8	R8-1	10	3 c.c. every 3 days. Subacute bronchitis at beginning of treatment.
10. K. L.	F. 52	63	3.2	5	5th	76	4.2	R8-1	10	2 doses a week: 3 and 4 c.c. alternating. S.C.D. Ulcer of leg.
11. T. M.	M. 55	54	2.9	5	4th	81	4.1	R8-1	10	1 c.c. daily for 1 week; then 2 c.c. R3-2 (10 grm. for 2 weeks.) No further retic. response on R3-2. S.C.D. Enlarged prostate.
12. F. W.	M. 53	15	0.8	30	6th	62	4.3	R8-1	20+	10 c.c. daily for 3 days; then 2 c.c. daily; later 4 or 6 c.c. every 2nd or 3rd day.
13. M. A.	F. 21	21	1.1	30	4th	59	3.6	R8-1	20	2 c.c. daily. Chronic tonsillitis.
14. L.D.	F. 35	29	1.5	4.7	7th	72	3.4	R8-1	20	10 c.c. R8-1 (100 grm.) every 3 days for 3 doses: then 10 c.c. per week. Very ill at first with acute pyelitis. S.C.D.
15. H. B.	M. 58	32	1.5	17	7th	72	3.2	R5-1	20	6 c.c. every 3 days. S.C.D.
16. R. S.	M. 63	35	1.3	25.8	4th	75	3.6	R8-1	25	10 c.c. every 4 or 5 days. S.C.D.
17. B. S.	F. 61	35	1.6	4%		57	3.8	R8-1	15	5 c.c. twice a week; marked arteriosclerosis.
18. M.L.	F. 39	47	1.8	8.6	8th	65	4.0 (18 days)	R8-1	15.5	5 c.c. every 3 days for *18 days only.*
19. L. J.	F. 42	45	2.2	14.6	5th	54	3.9	R5-1	20	2 c.c. daily. In this patient a large abscess developed in the buttock.
20. F. D.	M. 77	54	1.9	6	7th	65	2.9	R8-1	30	3 c.c. daily. S.C.D. Marked arteriosclerosis.
21. E. H.	F. 55	70	2.4	9.4	6th	80	4.1	R8-1	15.5	5 c.c. twice a week.
22. J. G.	M. 76	68	3.3			87	4.3	R8-1	15.5	10 c.c. week for weeks.

DISCUSSION OF THE RESULTS

Most of the patients responded quickly and well with an early reticuloeyte response, marked clinical improvement, satisfactory increase in hæmoglobin percentage and red blood count, decrease in the serum bilirubin to normal levels, and disappearance of the characteristic lemon yellow colour and of most of the symptoms and signs of pernicious anæmia. On the whole, the most rapid and most striking improvement occurred in those receiving the largest amounts of liver extract. All uncomplicated cases that were given the extract from 15 grm. of liver per day, or more, did well. Of the patients given an average dosage per day of the extract from 10 grm. of liver, 3 (cases 6, 7, 11) did well; 2 (cases 9 and 10), both of whom had an infection, made a fairly satisfactory recovery; but 2 others (cases 1 and 2) failed to improve materially until larger doses were given, when a satisfactory response occurred. Both of these had had previous treatment and both were more refractory to liver therapy than the average case. The fact that such refractory cases are found is an indication for the use of larger doses of liver extract in the treatment of all severe cases.

Liver extract administered intramuscularly is remarkably more effective than when the same amount of extract is given by mouth. The response to the intramuscular injection of the extract from 10 to 20 grm. liver per day is fully as great as that obtained following the oral administration of the extract from 250 to 800 grm. The relative effectiveness of the two methods of administration is shown by the results in case 2, illustrated in Chart III. This patient refused to take liver by month and would not be admitted to hospital. For ten days he was given daily 2 c.c. of extract R3-2 intramuscularly (the amount derived from 10 grm. liver). There followed a reticulocyte response of 8 per cent on the fifth day, with a slight increase in the hæmoglobin percentage and red blood count, but no appreciable improvement in his clinical condition. Beginning

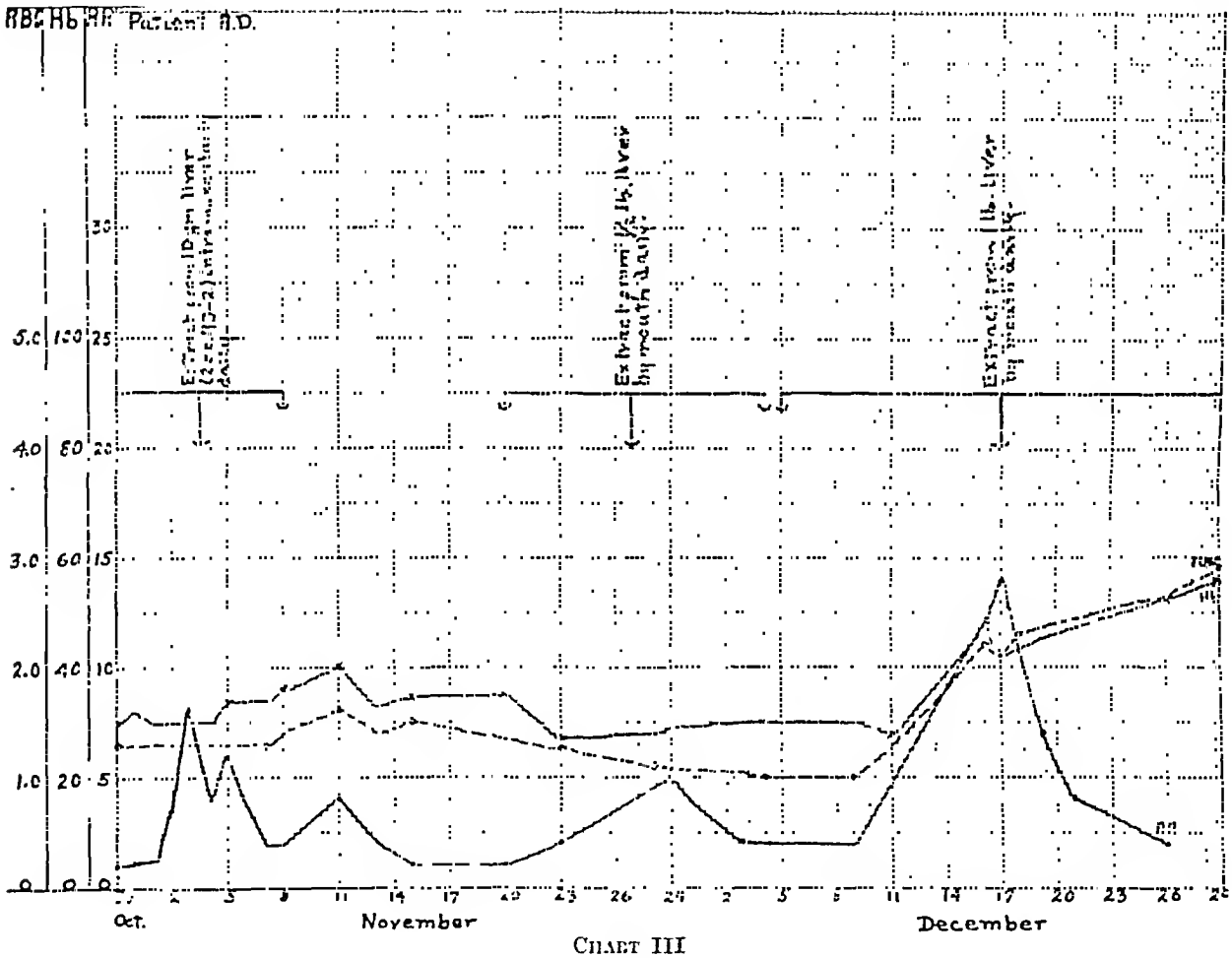

CHART III

one week after the last intramuscular injection, he took daily the extract from one-half pound (250 grm.) liver by mouth for fifteen days. The reticulocytes rose to 5 per cent on the ninth day, but there was no improvement in the blood picture or in his clinical condition. He was then given daily a fresh aqueous extract derived from one pound of liver (500 grm.) on which treatment he made a good

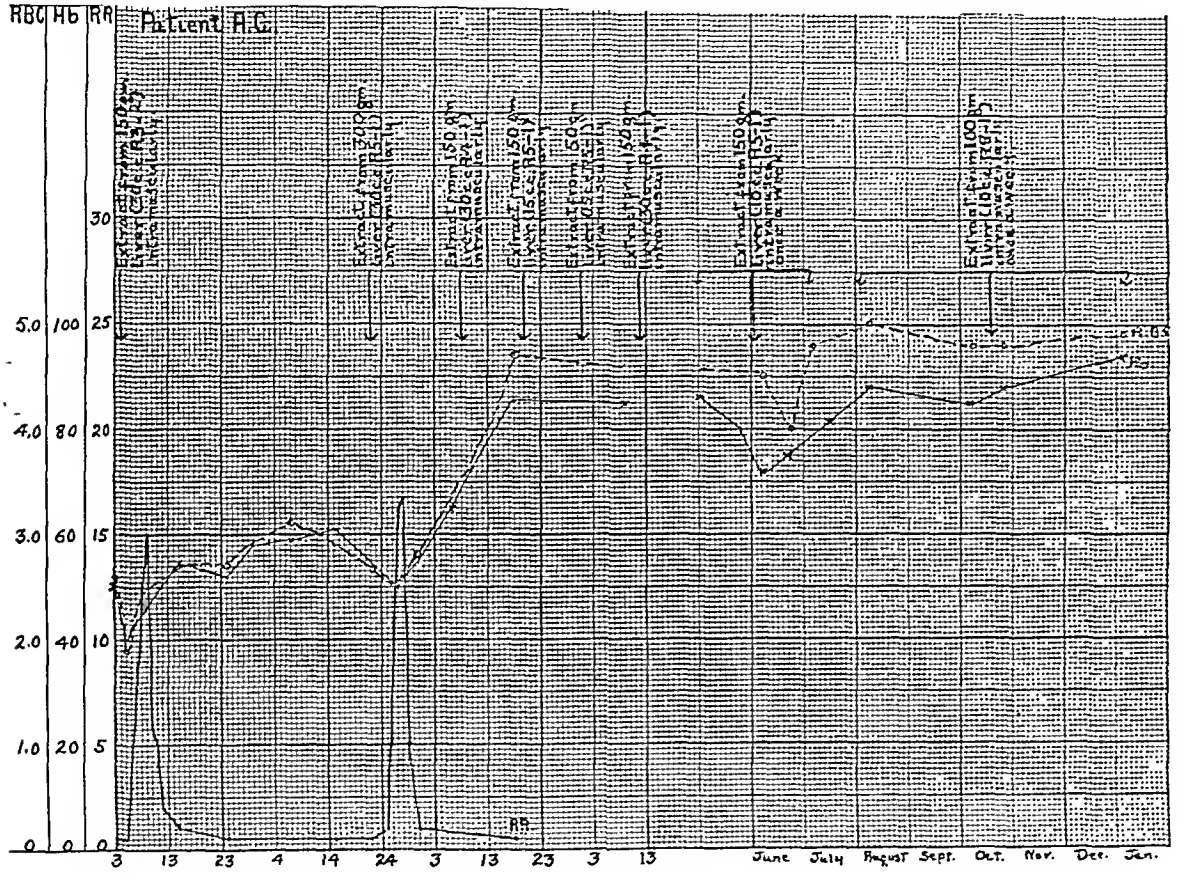

CHART IV

recovery with a reticulocyte response reaching 14 per cent on the twelfth day. In his case the daily administration of the extract from 10 grm. liver intramuscularly was slightly more effective than the ingestion of the extract from approximately 250 grm. liver per day, but grossly less effective than the ingestion of extract from 500 grm. liver daily.

Intramuscular liver therapy in severe relapse.—Perhaps the greatest value of intramuscular liver therapy is in the treatment of patients in severe relapse who are so ill that it is difficult to administer anything by mouth, and who are often unable to retain even small amounts of fluid. In such circumstances intramuscular therapy may be life-saving. On admission, patient 14 was critically ill in severe relapse complicated by acute pyelitis. She was extremely weak, almost comatose, with high fever. She vomited repeatedly. A small transfusion was given and the extract from 100 grm. liver was administered intramuscularly every day for three days, after which the same amount was given at weekly intervals. The reticulocyte response was low, probably because of the acute though transient infection, but she made a rapid and excellent recovery. Patient 12 was in a state of severe relapse with hæmoglobin of 15 per cent and a red blood count of 800,000. On similar treatment he made an early and rapid improvement, with a reticulocyte peak of 30 per cent on the sixth day.

Effect on the neurological lesions.—In 10 of the 22 patients there was sufficient involvement of the nervous system to warrant a diagnosis of subacute combined degeneration of the cord. Most of these were given intramuscular liver therapy for only one month, too short a period

for improvement in the neurological condition to become manifest. In 2 cases (4 and 20), however, there was definite improvement in the nervous manifestations while on intramuscular liver treatment only. One of these has now been receiving the extract from 30 grm. of liver intramuscularly per day for over four months and is still improving.

The ideal frequency of administration.—At first all patients were given relatively small amounts daily. Later, larger amounts at proportionately longer intervals were tried. Equally good results were obtained when extract was given every second, third or fourth day, or once a week, provided that the average amount per day was the same. There was no pronounced local discomfort unless more than 10 c.c. was given at one time. Three patients (cases 8, 16 and 22) have now received the extract from 100 grm. of liver by intramuscular injection of 10 c.c. of extract R8-1 once a week for upwards of five months. All three refused to take liver by mouth; they all prefer intramuscular therapy, come regularly for treatment, and none complains of any local reaction.

The results of such therapy in case 8 are illustrated in Chart IV. When readmitted in mild relapse on February 3, 1932, he was given 30 c.c. of R3-2 (extract from 150 grm.) intramuscularly. There followed a reticulocyte response with a peak of 15 per cent on the sixth day with some clinical improvement. By March 22 he was back to his initial condition. He was then given 30 c.c. of the stronger preparation R5-1 (extract from 300 grm. of liver). Again there was a reticulocyte response with a peak of similar magnitude on the sixth and seventh days, and more marked clinical improvement. Large doses were given at frequent intervals till midsummer: his hæmoglobin percentage and red blood count rose to normal and have been maintained at normal levels since that time by weekly injections of the extract derived from 100 grm.

Liver extract administered intramuscularly was also used with excellent results in a case of sprue with the blood picture of pernicious anæmia.

Conclusions

1. Liver extract prepared for intramuscular administration, as described, has been found safe, dependable, and effective when used in adequate dosage. Administered intramuscularly, a given quantity of extract is much more potent (at least thirty times) than is the same amount when given by mouth. The intramuscular administration of the extract from 10 to 20 grm. of liver a day is fully as effective as the ingestion of the extract from 250 to 800 grm. liver daily. A good reticulocyte response has been obtained from the single injection of the extract from 50 grm. liver. Nevertheless, it is to be pointed out that the results of intramuscular therapy are not better than those obtained by the ingestion of an *adequate amount* of liver or liver preparations.

2. Intramuscular liver therapy is of great value in the treatment of patients in severe relapse to whom large doses can readily be given by this method with assurance of an early response. The remission begins about a week sooner than when the extract is administered by mouth. It is also very useful in treating patients who refuse to continue to take sufficient amounts of liver or liver preparations by mouth. The intramuscular administration of the extract from 100 grm. of liver per week in one or two doses is probably sufficient to maintain most patients with pernicious anæmia in a good state of health.

3. It is extremely important, however, as has been amply demonstrated, in treatment by oral administration of liver or liver extracts always to give a sufficient amount, no matter how much may be required, to maintain the patient in good health with no anæmia, and to prevent the appearance or progression of nervous lesions.

NOTE: The preparation of the extracts was carried out under the direction of Dr. C. H. Best. Our thanks are expressed to him and to Dr. J. G. FitzGerald, Director of the Connaught Laboratories, for helpful interest. The authors also wish to thank Drs. C. P. Howard, Duncan Graham, A. H. Gordon, and C. A. Peters for placing the clinical material on their services at our disposal.

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SPONTANEOUS SUBARACHNOID HÆMORRHAGE

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SPONTANEOUS subarachnoid hæmorrhage is in my experience not often recognized by the general practitioner, and yet, once recognized, the picture is so characteristic that it can hardly again be missed. Much suffering can be saved by the early recognition of this condition, and judicious treatment often leads to complete clinical recovery. These grounds justify our consideration of this subject, even if the frequency of its occurrence is not great. I have record of 26 cases with this diagnosis in the past three years in the Royal Victoria Hospital, and the number might be greatly added to were cases better recognized and the possibilities of judicious treatment appreciated.

Subarachnoid hæmorrhage is, as the name implies, an extravasation of blood into the space between the pia and arachnoid membranes. It must come from a superficial vessel, and except as a consequence of trauma is practically always from a superficial cerebral vessel. By using the term "spontaneous" I wish to exclude all traumatic cases. Intracerebral hæmorrhage bursting into the ventricles might find its way into the subarachnoid space through the foramen of Monro, but death is very rapid in such cases and I have excluded them.

Age incidence.—No one is very much surprised at a cerebral hæmorrhage, whether intracerebral or superficial, in an older person, but the average age in these 26 cases was 38 years; the youngest patient was 12 years of age and the oldest 69. Fifty-one per cent of the patients were under 40 years of age. One patient, aged 13, was re-admitted within four months with a recurring hæmorrhage, and has been in four times since with recurrences, and is at present in the hospital recovering from her last attack. Another, aged 18, gave a history of what was probably a hæmorrhage at the age of 10 and another definite subarachnoid hæmorrhage at the age of 13.

Sex incidence.—In the cases which occurred before the age of forty, 8 out of 14 were females; above forty, 6 out of 12 were females. There were 14 females and 12 males in the series. A very striking difference in both the age and sex incidence is to be noticed, then, from the usual cerebral hæmorrhage or apoplexy; the usually accepted figures for this condition are—men are more often affected in the proportion of 7 to 5 and four-fifths of the cases occur after forty years of age.

ETIOLOGY

In two of the cases which I report, one, C.R., aged 34, in whom the hæmorrhage occurred eight hours after the delivery of a normal baby, and another woman, aged 57, who was known to have a left hydronephrosis and a right pyelitis and to have had a short period of fever some two weeks before, it seems possible that it might have been the result of an infective condition such as might have given rise to a mycotic aneurysm. In neither case could one do more than suggest this possibility. The first patient died and there was no autopsy, and the second made a good recovery. In 2 cases autopsy showed the hæmorrhage to have come from a ruptured mycotic aneurysm associated with subacute ulcerative infective endocarditis. There is no case of thrombosis of the longitudinal sinus in the series. This condition, and certain blood diseases, such as leukæmia, may give rise to subarachnoid hæmorrhage, but they do not happen in this series. There was a suspicion of vascular syphilis in one case only.

Consideration of any factor which might have immediately induced such a hæmorrhage revealed the fact that in 9 of the 14 cases below the age of 40 no history could be obtained of anything which might be considered as undue exertion leading up to the attack nor was disease of the organs discovered. In the other 5 cases the possible etiological factor seems insufficient. In the child of 12 there was a history of over-exposure to the sun and over-indulging his appetite for salmon, with consequent indigestion and vomiting. The other 4 cases were all associated with the toxicity of pregnancy.

three months, one at 7 months and one at full term; four were primiparæ and one a multipara. Altogether, the condition was associated with pregnancy in 5 cases.

In the patients over forty years of age, in the youngest two there was no obvious cardiorenal disease and there was no history of immediately preceding over-exertion. The younger of the two was very muscular, a labourer of 41 years of age, who looked as if he had worked hard, but apart from an aneurysm on the anterior cerebral artery his cardiovascular system was healthy, but autopsy showed another vascular developmental defect in the liver, a cavernous hemangioma. The third patient, a male aged 49, had had nephritis and hypertension for some time. A man aged 57 had vascular lues—at least his blood Wassermann test was three and a half plus, but his cerebrospinal fluid, though bloody, gave a negative Wassermann. A woman, aged 57, has already been referred to as having hydronephrosis in one kidney and pyelitis in the other. In another man the onset followed indigestion and vomiting. In two old ladies of 62 it followed what was possibly over-exertion for them, in one case carrying a young grandchild upstairs and in the other lifting a trunk. The last patient, a woman of 69, had had nephritis and diabetes for some years.

It is obvious that the greater the age of incidence the more likely is subarachnoid hæmorrhage to be associated with acquired constitutional disease which is probably an etiological factor. One cannot always assume the absence of acquired vascular disease, however, when one finds at autopsy in a young unmarried woman of 30 years, whose previous history and examination showed no cause to suspect it, miliary aneurysms of the cerebral vessels on a very definite atheromatous basis.

In the three of the five young women in which the condition occurred as a complication of various stages of pregnancy there was certainly toxicity involving the kidneys and producing more or less hypertension, but this had not lasted long enough nor been severe enough to rouse fears of such a serious complication. In the other young woman of 22 years, in whom it occurred in the third month, no kidney trouble had been present, although she had been vomiting and the hæmorrhage came on during a vomiting spell.

There are still left three patients under 18, in whom, clinically, no reason could be found for such a vascular catastrophe. In these cases particularly one must, I think, assume a developmental weakness of the vessel walls with aneurysmal dilatations.

Forbus[1] emphasized the independence of development of the muscularis of a major vessel and that of a primary branch. He offers this as a probable explanation of the muscularis defect and the frequency of formation of miliary aneurysms at the point of bifurcation of the vessels. The fact which he has observed, that the two independently developing muscular coats fail to fuse completely at the junction of the two vessels, leaving a place of lesser resistance in the vessel wall, determines where aneurysms will be likely to occur. It is interesting to see how frequently the aneurysm which burst was at the point where a branch was given off from a main vessel.

SYMPTOMS

The onset is always sudden with headache, which may begin in the frontal region, but soon becomes occipital as well and frequently spreads down the neck and back. It is often associated with vomiting so that it is difficult to say which preceded the other. The headache is severe, so severe that it seems to eradicate all other less important impressions. Consciousness may be dulled or unconsciousness may supervene; if dulled, the patient can be roused and when roused is rational, although restless and irritable. He is not toxic as in an infective meningitis. He cannot stay long in one place or in one position. He may get up and walk, but soon gets back into bed and writhes in pain. If coma or semi-coma supervenes the patient still shows some evidence of suffering in the extreme irritability. A generalized convulsion occurred in two cases in this series. In some cases there is a history of an abortive attack, a sudden headache, possibly associated with vomiting, perhaps preceding by a week the severe attack. It was less severe, however, although bad enough, lasted for two or three days, and then disappeared.

The chest and abdomen will probably show nothing pathological. The temperature is normal at the onset, and may be slightly elevated a few days later, probably from the

absorption of blood, the pulse a little slow though often slightly rapid, but one will find a definite stiffness of the neck to passive movement, especially seen in an attempt to put the chin on the chest. In more severe cases Kernig's sign will be present also, in the milder cases, and at the beginning it may be absent. There are as a rule no paralyses and no pathological reflexes. Examination of the fundi may show nothing pathological shortly after the onset, but in 50 per cent of this series there was mild blurring of the disc, either in one eye or both, and in 30 per cent of the cases definite hæmorrhages were seen in the fundi.

The urine showed albumin in 50 per cent of the cases; in 25 per cent casts were found. In three cases which were not diabetic, sugar was found during the early stages of the illness. In none of these cases did we find the massive albuminuria that has been described by Widal, and in all cases the albumin had disappeared before recovery was complete. The leucocyte count in the blood averaged 11,000. The blood pressure is usually on the high side.

Lumbar puncture of course clinches the diagnosis. The spinal fluid is under increased pressure. In colour it may vary from a pink to that of almost pure blood, and it is just as bloody at the end of the tap as it is at the beginning; and moreover in the test tubes this bloody fluid does not clot. If allowed to stand the cells sink to the bottom of the tube and the supernatant fluid remains coloured by altered blood pigment. These two points distinguish it from blood caused by a traumatic tap.

Withdrawal of the spinal fluid and the consequent relief of pressure gives great relief to the patient's headache, but judgment should be used lest further bleeding be encouraged. It is not wise to lower the intracranial pressure too rapidly at one time, nor too soon after the onset, before a clot has had a chance to form at the bleeding spot. At the same time it is important to remove as much of the blood as possible in view of possible sequelæ. Bagley has shown the attempt at absorption of the blood and the irritation of the meninges caused a meningitic thickening and a consequent block in the channels through which the fluid is returned to the blood stream, and this later may produce an internal hydrocephalus.

FORMS

One might describe (1) a meningitic type of the disease—and in this series 14 of the 26 were of this type. In every case the signs of meningeal irritation were present, that is severe headache, irritability and restlessness, and stiffness of the neck, but in 10 cases, either at the onset or it might be in course of the illness as already described, a second hæmorrhage occurred which partook of the character of an apoplexy causing a hemiplegia, and so we might describe (2) a meningitic type with apoplectic exacerbation, and (3) an apoplectic type with meningitic signs.

MENINGITIC TYPE

CASE 1

A suggestive history of over-exposure to the sun and over-eating as an exciting cause; result, recovery.

M. M., Hebrew, 12 years, was admitted on July 6th, complaining of persistent headache and some photophobia. He was perfectly well at a summer camp until five days before admission. At that time he had become severely sunburned and was kept in bed for a couple of days because of the pain. Three days before, after eating freely of salmon, he vomited copiously and since then had had severe and continuous headache. He was taken to a nearby sanitarium. Because of the stiffness of the neck and the presence of Kernig's sign a lumbar puncture was done the night before admission to us and bloody fluid withdrawn. Beyond the fact that he was a premature child there was nothing important in his personal or family history. He was somewhat dull, but cooperative, and complained of severe headache. On admission, there was still a little stiffness of the neck, and Kernig's sign was not more than suggestive. There was a slight hypersensitiveness to light and the fundi showed fullness of the retinal veins and definite blurring of the nasal side of both optic discs, with a small hæmorrhage near the disc in each eye. The cranial nerves were otherwise normal. There were no paralysis, sensory or motor, and no abnormal reflexes. Nothing pathological was found in his various viscera. The pulse was 66 and the blood pressure 100/70. The urine was alkaline, specific gravity 1015, with a trace of albumin and no sugar; microscopically, nothing pathological. The blood showed 14,200 leucocytes per c.mm. On lumbar puncture the cerebrospinal fluid gave a pressure of 200 mm. of water, was a uniform pink in all tubes, and contained many red cells; on standing the red cells collected at the bottom of the tubes, the supernatant fluid remaining of a yellow tint. A paralysis of the right external rectus developed two days after admission, lasted some two weeks, and gradually passed away.

Lumbar puncture on July 11th, 5 days after admission, still showed a faintly yellow tinge to the cerebrospinal fluid. By the 13th the cerebrospinal fluid was clear. He was discharged on July 20th, having made a complete recovery.

CASE 2

Three recurrences at intervals of years with no apparent exciting cause in any one of them; meningeal signs, with later signs suggesting a unilateral lesion of pons; result, recovery.

Miss S. E., Hebrew, aged 18, admitted on December 9, 1928, complaining of sudden loss of consciousness and severe headache.

She had been perfectly well until November 21st. While doing light house work she suddenly felt weak and dizzy and fell unconscious. On recovering consciousness after a few minutes she had severe pain in her head in the frontal and occipital regions and vomited. She was put to bed, but the headaches were persistent and terribly severe. Six days later (November 27th) lumbar puncture withdrew uniformly bloody fluid and this was repeated a few days later. Following the second puncture she felt well, although she was still kept in bed and while still in bed she again lost consciousness followed by severe headache and vomiting. During her present illness her temperature did not go above 99° until the morning of admission, when it went up to 103°.

At the age of 10 and again at 13 she had had somewhat similar attacks, coming on suddenly without apparent cause and characterized by severe headache, loss of consciousness and vomiting. In both attacks the cerebrospinal fluid was bloody.

After the first attack at the age of 10 she was left with a right hemiplegia and aphasia. The aphasia lasted only a few days, and the hemiplegia three weeks, but she eventually made a complete recovery. The second attack seemed to have come on after vomiting. She lost consciousness and had a generalized convulsion. No paralysis followed, but the day after she got out of bed, two weeks later, she suddenly felt weak and nauseated, the headache became severe and she lost consciousness. She developed a bilateral internal strabismus, and again lumbar puncture is reported to have shown blood-stained fluid.

Her personal and family history showed nothing relevant.

On admission she was somewhat stuporose, and was suffering from severe headache, frontal and occipital. When roused she was well oriented, intelligent and cooperative. The right optic disc was blurred in outline, showing a mild degree of swelling; no hæmorrhages were seen; the left disc was normal. The left pupil was somewhat larger than the right, and the left palpebral fissure was wider than the right. There was some rotary nystagmus, counter-clockwise in direction, on looking to the right and up. The ocular movements were not otherwise affected. There was some relative impairment of sensibility of the right cornea and the right side of the face as compared to the left. Some weakness on the right side of the face; hearing was equal on both sides; the palate was elevated in the mid-line. The tongue showed some fibrillation and a suggestion of atrophy of the right side. There was a slight relative weakness of the left arm and leg with increased tone, especially in the leg. No incoordination was revealed by the finger-nose or knee-heel test. Besides the impairment as noted above in the distribution of right fifth cerebral nerve there was a relative impairment of sensibility to pin-prick and temperature in the left leg below the knee, and to a lesser degree over the left side of trunk. There was no loss of sense of position. The tendon jerks were relatively more active in the left arm and especially in the left leg, and patellar clonus was obtainable on this side. The abdominal and epigastric reflexes were obtained on the right side, and not on the left. The plantar on the left side was extension, right flexion. Pressure on the right eyeball caused no slowing of the pulse, but on the left eyeball slowed it from 94 to 86.

The pulse was 105, regular in rate and rhythm, rather bounding in type; blood pressure, 120-70. The heart was not enlarged, the sounds clear, no murmurs. Blood count: red blood cells 5,100,000; white blood cells 9,000; hæmoglobin 90 per cent. The urine was alkaline, 1017, with no albumin, no sugar, no diacetic acid; microscopically, bacteria and epithelial debris.

Previous to admission the cerebrospinal fluid had been removed on at least two occasions. It was uniformly bloody and did not clot; when centrifugalized the supernatant fluid remained of an amber colour. The Wassermann test of the cerebrospinal fluid was negative with routine and reinforced antigen.

The patient was kept absolutely quiet in bed and made a slowly progressive recovery. One hesitated to repeat the lumbar puncture, because a recrudescence of the bleeding had occurred on two previous occasions. It is quite true this did not become evident until four or five days after the withdrawal of fluid, and did not seem to be dependent on it at all, but the symptoms and the headache did not seem severe enough to justify further interference, although one would have liked to have got rid of as much of the extravasated blood as possible from the cerebrospinal spaces.

She was discharged to her home January 4, 1929, quite recovered clinically, although the extensor plantar response and diminished abdominal reflexes were still present one month later.

CASE 3

Meningitic signs associated with the puerperium in a primipara, with localizing signs pointing to the left frontal lobe; recovery.

M. V., aged 24, a pre-eclamptic, was admitted to Dr. Kearns' service in the Royal Victoria Montreal Maternity Hospital on July 21, 1931, complaining of vomiting. Her urine showed albumin and some fragments of granular casts. On July 22nd, at 8 p.m., she went into labour and progressed rapidly. About 11 p.m. she complained that she was losing her eyesight. The patient was bled 300 c.c. and when full dilatation occurred low forceps were applied and a normal male infant extracted.

Examination of the fundi the following day showed nothing pathological, but the patient was said to be somewhat irrational at times, and became drowsy, irritable and restless. When seen on the 27th she was stuporose, but she reacted promptly and irritably to painful stimuli; she did not speak. There was marked rigidity of the neck and Kernig's sign was positive. Her temperature was 100°, the pulse 72. Lumbar puncture revealed bloody fluid with a pressure of 400 mm. of water. The pressure was reduced to 210 mm., and this gave considerable relief.

The following day the patient had three convulsions, one of which is reported to have affected the right side of the body. Following this she showed diminution of sensibility to pin-prick on the right lower leg and foot and a very suggestive right plantar extension at times only. The patient was still somewhat stuporose, but improved. Lumbar puncture, with the withdrawal of bloody fluid, and the lowering of the pressure was repeated from day to day. July 30th the patient was much more comfortable. She evidently saw objects but could not name them; she used the wrong words and phrases and apparently did not understand completely when spoken to. When familiar objects were put into her hand she did not apparently know what they were for or how to use them. There was a slight blurring of the nasal side of the disc, but no evidence of retinal hæmorrhage. The cranial nerves were otherwise normal. There was no actual motor paralysis, but she did not move the right leg as well as the left. No sensory impairment could be made out. The reflexes were now normal and she made steady improvement. The understanding of spoken language and the appreciation of the use of familiar objects cleared up first, leaving her with a motor aphasia and inability to write. Then the motor aphasia cleared, leaving her with ability to copy words but not to write spontaneously, and, finally, on her discharge from the hospital, her spontaneous writing was very halting and had many mistakes and omissions. Two

months later, however, she had apparently made a complete recovery. I have no doubt she had a bleeding from an anterior communicating artery tearing into the left frontal lobe.

On her discharge, August 13th, her urine showed only a faint trace of albumin and no casts. The blood and cerebrospinal fluid Wassermann tests were negative. Beyond a slight increase in the chlorides, blood chemistry examination gave normal values. The blood picture was that of the immediate reaction to considerable blood loss, plus evidence of liver damage. Coagulation time was delayed.

MENINGITIC AND APOPLECTIC TYPE

CASE 4

Localizing signs pointing to the left frontal lobe; death. Autopsy showed a ruptured aneurysm on the anterior communicating artery.

D. K., male, labourer, aged 41, was admitted on November 10, 1931, complaining of headache, stiffness of neck, nausea and vomiting. He had been perfectly well until November 6th at 11.15 p.m. when he got a sudden headache, felt chilly, was nauseated and vomited. The headache had persisted since then, localized in the temporal region. Vomiting had also been persistent and was projectile in character. Stiffness of the neck and back were noted on November 7th, and had continued until admission. Photophobia had been complained of. He had been in bed since the onset and was brought to the hospital in the ambulance.

Personal and family history were unimportant.

Muscularly he was very well developed. He lay in bed with his neck slightly retracted, was somewhat stuporose but cooperated fairly well.

The cranial nerves showed nothing pathological. The pupils were equal, active to light and accommodation; there was a slight conjunctival hæmorrhage in the right eye. Fundi showed engorgement of the veins but no hæmorrhages. There was no paralysis, either motor or sensory; no pathological reflexes. Kernig's sign was positive.

The pulse was slow, 44 on admission, of regular rhythm; blood pressure 122/84. No enlargement of the heart and no adventitious sounds. The lungs, abdomen and genito-urinary system showed nothing pathological. The urine showed no abnormality.

Lumbar puncture gave an initial pressure in the cerebrospinal fluid of 310 mm. of water. The fluid was uniformly bloody in all three tubes. The pressure was reduced by withdrawing fluid to 170, with some relief to the patient. The blood and cerebrospinal fluid Wassermann tests were negative. The next day, November 11th, lumbar puncture was repeated with similar findings; the initial pressure was 240 and this was reduced to 175, again with relief to the patient. On November 13th there was sudden severe headache, the respiration became stertorous, and the patient became unconscious. The blood pressure rose to 225 from 120. Lumbar puncture showed a pressure of over 600, with very bloody fluid. Great relief was obtained by an intravenous of 50 c.c. 25 per cent glucose-saline. The patient regained consciousness, but was apparently aphasic. He now showed a slight swelling of the optic discs, but no evidence of retinal hæmorrhage. While the tendon-jerks were all absent the plantars were flexion on both sides. The following day, however, he had developed definite evidence of involvement of the pyramidal tract to the right side, with hemiplegia and aphasia and right plantar extension. He developed bronchopneumonia and died on December 3rd, three weeks after admission, having remained hemiplegic and aphasic to the end. During life we had thought he had ruptured aneurysm of the left anterior cerebral artery, but as a matter of fact autopsy showed a ruptured sacculated aneurysm of the right anterior cerebral which had torn into the opposite frontal lobe. Dr. Chase reports that section of the artery showed a wide defect in the muscularis at the acute angle of branching. The liver showed a small typical cavernous hæmangioma. There were no other demonstrable vascular abnormalities.

CASE 5

No apparent immediate cause; apoplectiform onset, proceeding to meningeal signs and coma; fatal result; marked atheromatous changes in the cerebral arteries.

Miss E. H., aged 30, was admitted to the Royal Victoria Hospital on April 7, 1929, in a semi-conscious condition. The history as obtained was that suddenly on April 1st she complained of being nauseated and dizzy, and she vomited. This attack passed and she felt well all week. On the day of admission to the hospital, however, after being perfectly well all day and perfectly normal in her actions, at 5 p.m. she complained of pain in the back of her head and neck, and said that things looked blurred through her right eye. Soon after the onset of headache she vomited, and then went into a generalized convulsion. Following this she talked in a rambling manner, and there were from time to time, in spite of a heavy sedative, convulsive twitchings of the limbs. The headache was persistent and severe, extending down the neck.

The patient had been subject to the common colds, but apart from this she had enjoyed good health all her adult life. She had had measles and whooping-cough in childhood, and enlargement of the cervical glands which had been operated on many years ago. At 12 months of age she had had one convulsion.

Examination showed a well-nourished female lying quietly in bed with eyes closed, breathing in a slow deep regular manner. She could be only partially roused, and would open her eyes, but could not talk. There was marked rigidity of the neck, but her limbs were quite flaccid . There was no particular odour to her breath. Her colour was pale.

Examination of the glandular and respiratory systems showed nothing pathological. Pulse, regular, 90, of good volume; blood pressure 190/110. Heart not enlarged; no adventitious sounds; aortic second sound accentuated. The abdomen showed nothing pathological. Urine, specific gravity 1013, no albumin, a small amount of sugar; no diacetic acid, no blood; microscopically an occasional pus cell. The arm-jerks were not obtained on the right side; present, but sluggish, on the left. Knee-jerks not obtained on right side, present but weak on left; ankle-jerks, not obtained. Plantar flexion on both sides; abdominals present on both sides, but sluggish. The following morning she was in much the same condition. She had developed a conjunctival hæmorrhage in the right eye. On examination of the fundi Dr. Tooke reported as follows: "The right fundus shows the following picture. One can get practically no definition of the disc on this side except a suspicion towards the nasal side. Practically the whole of the disc, with this slight exception, is covered by a dense blood clot which seems to follow the course of the inferior temporal vein at least half way forward to the ora serrata. This clot is sharply outlined in its periphery, and shows signs of organization at its centre, but is dark in colour. There were a few, relatively small, scattered hæmorrhages at the nasal side of the disc of more recent origin. The larger hæmorrhage in question is doubtless the result of a venous thrombosis at a point where the descending vein emerges from the centre of the optic nerve-head. One cannot make out any unusual arterial changes; the patient is suffering from a certain degree of cerebral irritation, and not submitting very well to an examination. The fundus of the left eye is normal in all particulars."

The urine still showed a trace of sugar, but no albumin. She became restless and irrational, vomited several times, and complained bitterly of pain in her eyes and back of her head.

Lumbar puncture showed deeply and evenly stained bloody fluid in all three tubes. There was no clotting of the blood, and when it had settled the supernatant fluid remained quite yellow. Withdrawal of spinal fluid seemed to give some relief for a time, she became quieter and more rational, and the blood pressure came down to 148/90.

The blood examination showed red blood cells 3,500,000; white blood cells 22,000; hæmoglobin 70 per cent. Wassermann test negative. Urea 0.324 grm. per litre; urea nitrogen 12.12 grm.; uric acid 2.28 grm.; creatinine 1.03 grm.; sugar 0.156 per cent; CO_2 56 vol.

On the morning of the 13th, five days after admission, she had developed a conjunctival hæmorrhage in her left eye. Her pulse had become more rapid and poor, and she now showed a definite plantar extension (Babinski) on the left side and the abdominals could not be obtained. She died that evening. The diagnosis of a subarachnoid hæmorrhage with localization of the bleeding point in the right cerebrum was made. Permission for a complete autopsy unfortunately could not be obtained, and we had to content ourselves with the examination of the head only.

The brain showed a huge extravasation of blood at the base, which had apparently come from a rupture of the right anterior cerebral artery close to where the communicating branch to the left anterior cerebral was given off. The hæmorrhage had torn into the brain substance of both hemispheres at this point, especially the right, where in one place it had penetrated almost to the anterior horn of the ventricle. It had spread over the surface of the brain under the membrane, especially over the base and along the right optic nerve particularly. Just behind the globe of the right eye, a bluish swelling of the membranes covering the optic nerve (Fig. 1) was obviously due to a collection of blood which had been forced along this space, and which, one imagined, must have exerted a considerable strangling effect on the optic nerve and its contained vessels, and might well, by the pressure exerted on the central vein, account satisfactorily for the fundal hæmorrhages.

At the site of the hæmorrhage in the brain the incoming and outgoing vessel was obtained with the massive blood clot attached, and the whole cut serially. The vessel walls showed no abnormality, and, although examined serially, there was a part of the vessel which had evidently been entirely destroyed by the hæmorrhage, and which could not be found. The clot showed the deposition of fibrin and early organization. In the centre of the clot the leucocytes, caught among the strands of fibrin, showed more or less disintegration, while elsewhere one still saw fairly stained leucocytes and less fibrin. The small vessels which happen to be in the section showed nothing abnormal in their walls. Careful search of the cerebral vessels revealed small macroscopical irregularities on both the right and left middle cerebral arteries which on section showed under the microscope all grades from beginning to very advanced stages of atheromatous changes, with localized thinning of the muscle layer, overgrowth of the intima, and splitting of the elastic layer, with in some places its entire disappearance. The degenerative changes taking place in this formed tissue with consequent weakening of the wall in places, and the beginning of an aneurysmal bulging.

B. [illegible]y in his work on "Blood in the cerebro-spinal fluid" shows in his photomicrographs what appears to be a similar condition in his cases 4, 5, 6, all occurring in the anterior cerebral artery in relatively young people, the average of these cases being 33 years.

In the 26 cases there have been 10 deaths; in 8 of these autopsy was performed. Two, aged 44 and 38, showed the hæmorrhage to have come from mycotic aneurysms associated with a subacute infective endocarditis. In 3, aged 30, 41 and 59, the ruptured aneurysms were associated with other developmental defects in the vascular system, such as absence on one or both sides of the posterior communicating artery; in one case, the presence of a cavernous hemangioma in the liver.

In 4 autopsied cases the aneurysm was on the anterior communicating artery; each middle cerebral artery was affected in one case; both middle cerebrals in one case, and the posterior cerebellar in one case. In the next patient, aged 31, a chronic hypertension was thought at autopsy to be due to the presence of a cortical adenoma of the adrenal glands. In the last, aged 63, hypoplasia of one kidney, associated with atheromatous changes was found.

COMMENTS

It is not often possible, from the signs present, to localize the site of bleeding vessel, although in four cases, in one proven correct at autopsy, we have located the bleeding from the anterior communicating artery. Localizing signs must necessarily mean involvement of brain-tissue, and what happens in the case of the anterior communicating artery is that the opposing inner surface of the frontal lobe is torn by the force of the hæmorrhage. Clinically, one finds pathological reflexes, or a hemiparesis, or even a hemiplegia, which point to one hemisphere. The leg is usually more involved than the arm, and there may be some impairment of sensibility over the leg and foot on the affected side. If it happens to be the left hemisphere which is involved we will often find evidence of a more or less complete aphasia, and, as in one case given in detail above, a complete though temporary apraxia and sensory aphasia as well. The hæmorrhage in itself does not extend to the internal capsule. It is more likely to and sometimes does extend into the anterior horn of the ventricle and cause death, as in both our autopsied cases, but the shock of the hæmorrhage to the neigh-

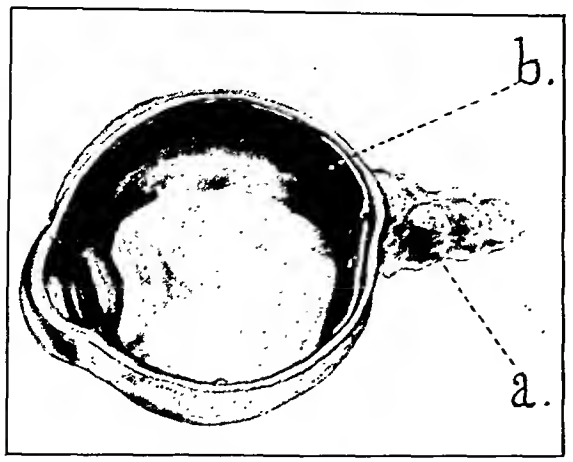

FIG. 1.—*Case 5.* Showing (a) a bulging of the membranes covering the optic nerve, due to an extravasation of blood from a subarachnoid hæmorrhage; (b) retinal hæmorrhage.

bouring cortical parenchyma and the subsequent œdema of the cerebral tissue put these cells out of commission functionally for a time. In patient 3 the sequence of recovery of the various parts of her speech mechanisms put beyond doubt the localization of the destructive lesion in the inner surface of the frontal lobe.

It is extraordinary how often spontaneous subarachnoid hæmorrhage does occur at the junction of the anterior cerebral and the anterior communicating arteries. In this series 7 such cases occurred, 4 diagnosed clinically, 1 of these proved, and 3 localized only at autopsy. Bagley[2] reported 5 cases, ranging in age from 12 to 44, with aneurysms of the anterior cerebral arteries.

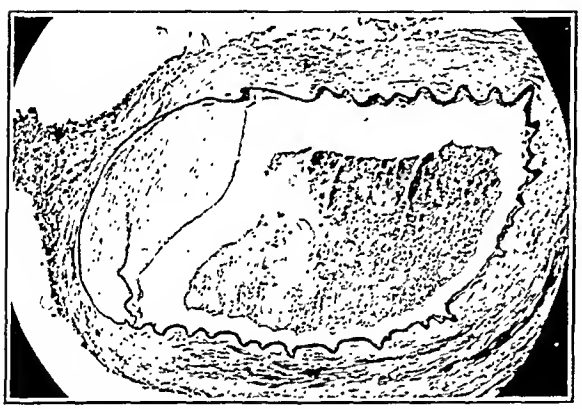

FIG. 2.—*Case 5.* A branch of the right middle cerebral artery showing atheromatous changes in a woman of 31 years.

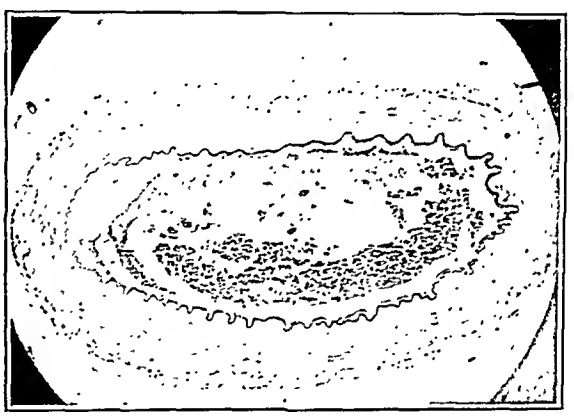

FIG. 3.—*Case 5.* A branch of the left middle cerebral artery showing a similar picture to Fig. 6.

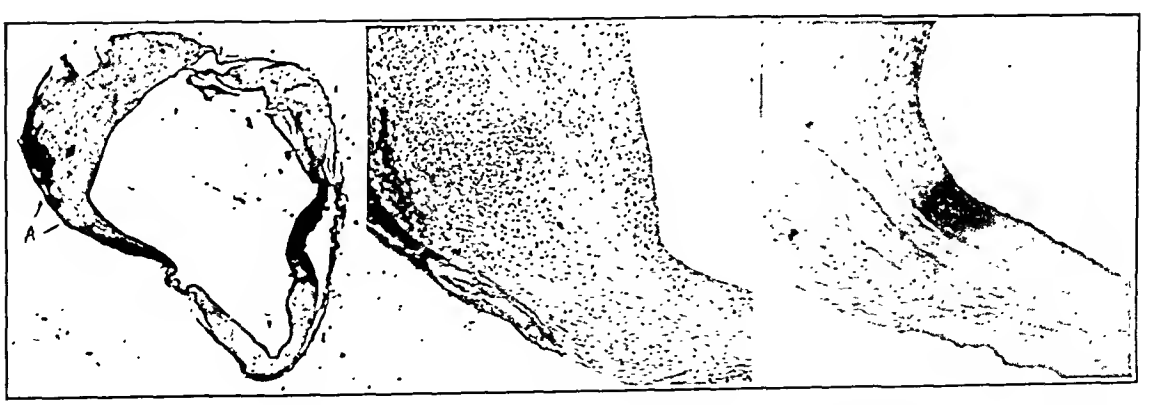

FIG. 4.—*Case 5.* A branch of the right middle cerebral artery showing extraordinary irregularities in thickness of the vessel wall, due to atheromatous changes in a woman of 31 years.

FIG. 5.—*Case 5.* Section of the artery at A in Fig. 4 showing the degenerative changes in the vessel wall.

FIG. 6.—*Case 5.* The elastic layer is deeply placed in the wall of the vessel and fragmented, owing to the endothelial overgrowth.

Busse[3] examined the anterior cerebrals and communicating arteries of 400 consecutive cases. Compared with the usually accepted text-book description, he found anomalies in 56.75 per cent, that is in 227 cases. In 112 the anastomosis was not according to the ordinarily accepted description. In 76 a more or less complicated network joined the two anterior cerebral arteries. In 39 cases, practically 10 per cent, definite aneurysmal dilatation was present. In only 173, or 43 per cent, was it according to the text-book description.

Developmentally, according to Kiebel and Mall, the communication between the two anterior cerebrals is a capillary plexus, which later, by development of one vessel and absorption of others forms the anterior communicating artery, explaining how a more or less complicated network may often be left. Busse[3] has found fibrous band remnants of the earlier network in the walls of the arteries in many cases, giving rise to a relative weakness of the walls. The force of the double stream from the two anterior cerebrals entering the anastomosing artery, with the currents which must thus be set up, he thinks, tend to cause the distension of these, often weakened vessels, producing aneurysmal dilatation.

With regard to the retinal hæmorrhage, Upthoff[4] has seen the onset of papillœdema within half an hour after the onset of the subarachnoid hæmorrhage. Paton and Holmes[5] showed that when the sheath of the optic nerve is distended in cases of increased intracranial pressure with papillœdema, the lumen of the vein in the subarachnoid space is flattened and much narrowed; and there is œdema of the nerve which is found to end abruptly at the point where the vein leaves it. It seems likely that, as Riddick and Goulden[6] suggest, the papillœdema and the hæmorrhage in the retina are due to the interference with the venous return from the retina and optic nerve rather than to a rupture of the hæmorrhage through the retina, of which there is no evidence microscopically.

The etiology of the disturbance of the kidney function is an interesting speculation. In none of these cases reported here has it been very marked or extensive, in one case a mild glycosuria, in the others, a moderate amount of albuminuria. In many of the cases reported in the literature the disturbance has been much more marked, massive albuminuria, as described by Widal,[7] being not an uncommon finding and sometimes red blood cells are found. Schneider[8] suggests that it is due to stimulation of Claude Bernard's point in the 4th ventricle, but this does not seem very convincing. One is tempted to surmise that the high blood pressure has been of sudden onset, caused by the great and rapid increase of intracranial pressure, and the disturbed abnormal urinary finding is an evidence of this sudden change of the systemic pressure on the kidneys.

Another interesting point in these cases is that the blood in the cerebrospinal fluid, when withdrawn by lumbar puncture, does not clot even when in excessive quantities and when to the naked eye it appears to be almost pure blood. There is no doubt that the blood clots normally enough at the site of hæmorrhage, but one must imagine by the time it has permeated down through the interstices of the subarachnoid space to reach the lumbar cord it has become defibrinated.

SUMMARY

An attempt has been made to describe the clinical picture of spontaneous subarachnoid hæmorrhage. As a complication of the various stages of pregnancy, 5 cases in 26, it is to me very impressive. Developmental defects are undoubtedly the underlying factors in the majority of cases. The older the patient, the more likely it is that acquired disease is the cause. Advanced atheromatous changes occur with surprising frequency, even in young people, as shown in 1 of my cases and 5 reported by Bagley, the average age of these 6 cases being 32 years of age. Syphilis is not often a factor in the causation of cerebral aneurysm.

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CARBUNCLE OF THE KIDNEY

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CARBUNCLE of the kidney was first described as such by Israel in 1891. Since a carbuncle is generally defined as a "deep-seated circumscribed inflammation of the subcutaneous tissue," its use in connection with an organ such as the kidney has been questioned. The fitness of the name, however, by reason of its vivid descriptive value, will be admitted by anyone who has had the privilege of seeing a typical specimen. It must be remembered that septic infarcts, multiple abscesses, etc., have also been classified as carbuncles by some writers, but the typical carbuncle, as described by Israel, is a firm, sharply defined mass, and except for the numerous areas of suppuration might well resemble an imbedded tumour.

The cases which form the basis of this report conform accurately to Israel's specifications, and we present them because of their rarity. Brady,[2] who has carefully surveyed the literature, was able to find 87 cases and has added one of his own. This includes those cases of solitary abscesses which were taken to represent the end-stage of carbuncles. Patch[10] and Smirnow[11] take the view that genuine carbuncles have no tendency to break down and coalesce, and hence these cases should not be included. Under these circumstances the actual number of reported carbuncles would be much diminished. On the other hand Kohler points out that the circumscribed areas of suppurative nephritis, the isolated kidney abscesses, and the carbuncles are all of metastatic origin and hence have much in common.

CASE 1

A male, aged 19 years, was admitted on February 11, 1932 complaining of indefinite pain in the left side of chest and loin; chills and fever; nausea and loss of appetite.

History of illness.—In November, 1931, the patient had a series of infected hair follicles starting on the neck and spreading to the face. This was followed by a series of boils, chiefly on the neck. The last boil cleared up on January 19th. About the same time he noticed a dull aching pain in the left loin. The pain was more or less constant for about a week and then disappeared. He consulted his physician on February 3rd, complaining of a recurrence of the pain. At this time he stated that he felt as if he had a lump in his side which seemed to shift about. The pain increased on coughing. He returned on February 11th, complaining of the pain being more severe, being now felt in the left groin. It was accompanied by frequency of urination and aggravated by exertion. His appetite was diminished. He was nauseated with chills and fever. He was admitted to the hospital for observation on February 11th.

Examination.—On admission the patient was thin, pale, and looked ill. Temperature 102° F.; pulse 110; respirations 22. The general examination was otherwise negative. Red blood cells 4,000,000 cells per c.mm.; white blood cells 27,000; hæmoglobin 65 per cent. Widal reaction—paratyphoid B. agglutination in 1-20.

Urinalysis.—Amber; reaction acid; sp. gr. 1.020; albumin, negative; sugar, negative; an occasional red and white cell. Repeated blood cultures were negative.

At the end of a week the leucocyte count fell to 12,000 cells per c.mm. and because of a paratyphoid B. agglutination of 1-80 the man was isolated as a possible case of paratyphoid fever, but repeated blood cultures remained negative. An x-ray of the chest was negative except for a slight lagging of the left dome of the diaphragm. The patient continued to run a temperature of 100 to 104° F., with no localizing symptoms. He complained intermittently of pain over left side of abdomen and of slight cough.

Genito-urinary system.—Kidneys, not palpated. No definite fullness or tenderness in either loin. Ureters; no tenderness along the course of either ureter. Bladder, not distended; not tender. Prostate, small, soft, not tender. External genitalia, normal.

Cystoscopic examination.—F 24 cystoscope passed; urethra tight. Bladder mucosa normal. Ureteral orifices normal. Both ureters were easily catheterized. Clear urine of equal concentration was obtained from each side.

X-ray examination.—Showed catheters in normal position, with no abnormal shadows. The left pyelogram (5 c.c. of Sod. Iodide, 12 per cent) showed a normal renal pelvis with an elongated upper calyx. Slight dilatation of the lumbar portion of the ureter. The examination was essentially negative, but in view of the history a tentative diagnosis of perirenal abscess was suggested.

A few days later the patient complained of pain over the left precordial area. Simultaneously with this, dullness was noticed at the base of the left chest and 20 c.c. of clear fluid were aspirated. The fluid proved to be sterile on culture, contained a few lymphocytes, and was classified as a sympathetic effusion. The patient continued to complain of pain in the lower part of chest and the fever remained constant. At times tenderness could be elicited, and, though no very definite fullness developed, in view of the history it was thought wise to open the perirenal tissues.

March 4th.—A small incision was made in the left costo-vertebral angle. The muscles appeared to be normal. On freeing the last rib pus appeared from the angle and a large cavity was discovered between the upper pole of the kidney and the diaphragm. A large drainage tube was inserted together with a cigarette drain, and the wound closed. Culture of the pus showed *Staphylococcus aureus* which was definitely haemolytic.

There was free drainage with a drop in temperature for the first 48 hours, but after this drainage diminished, and the temperature returned to its previous level. It was then felt that there must be a deep-seated lesion in the kidney, and a diagnosis of kidney carbuncle was then made.

March 14th.—Second operation— with a curved loin incision. The lower pole of kidney was exposed and appeared normal. As the hand approached the upper pole the kidney was found to be greatly enlarged and adherent. Much oozing occurred as it was freed. The upper pole extended high under the diaphragm and could not be safely freed. The pedicle was clamped and cut and the upper pole was then forcibly freed. The adhesions here were very dense so that they had to be cut; they pulled on the kidney as the diaphragm moved.

FIG. 1.—The specimen showing an embedded mass resembling tumour, but in the recent state exuding pus. The perirenal tissue overlying is necrotic.

Grossly, the lower pole of the kidney was comparatively normal but the upper one much enlarged. Toward the upper pole the coverings and perirenal tissue were much thickened and densely adherent to the kidney. There were several ragged sinuses which exuded pus. On section, the greater portion of the upper half was replaced by a large necrotic mass with many points of suppuration separated by strands of connective tissue, giving the area a lobulated appearance resembling a typical carbuncle. In the absence of pus, tumour might easily be suspected. It extended deeply in from the surface of the kidney, almost involving its entire thickness, but apparently had not invaded the pelvis. Nearer the surface there was a fairly definite capsule, but deeper down this was not clearly defined. The remaining kidney tissue was pale from toxic changes. (See Fig. 1.)

Microscopic section showed abscess cavities containing pus. The surrounding kidney tissue was infiltrated with inflammatory cells and exudate.

Following the secondary nephrectomy the patient's temperature fell and his condition improved markedly. Secondary anæmia was present, but improved under tonic treatment. He was discharged on April 16th. He has steadily improved, is now quite well, and has gained 40 lbs.

CASE 2

A female, aged 22, was admitted on July 15, 1932.

Complaints.—Indefinite pain across the abdomen; chilliness and fever; loss of appetite.

History of illness.—The present illness began suddenly with chilliness and fever while the patient was out bathing, ten days before admission. This was followed by loss of appetite and abdominal cramps, with a slight afternoon rise in temperature for the next few days. She was brought to hospital for observation and after two days' rest her temperature remained normal and she was allowed to go home. When she got up, however, her temperature again rose each afternoon, sometimes to 101°, and the pain returned, being felt sometimes across the abdomen and sometimes definitely in the left flank. She had no appetite and was constipated. At times she complained of a feeling of fullness in the loin and some tenderness. There were no bladder symptoms. She was finally admitted to hospital July 15th.

Her previous history was significant. One year ago in July she had had a large carbuncle in the left loin, requiring incision. This was followed a month later by an exceedingly severe attack of septic tonsillitis for which she spent four weeks in hospital. Her tonsils were removed and she regained her usual robust health, but in November had a second, less severe, carbuncle in the axilla. This was followed by a series of skin infections which she described as "blind boils," and which did not go on to suppuration. They continued throughout the winter, but caused no particular indisposition, and she was apparently in perfect health until the onset of her present illness. During a few weeks prior to this she had at times remarked about a feeling of tiredness in her left side, but this was of a transient nature.

Examination.—On admission to hospital the patient was well nourished, of good colour, and did not look ill. Temperature, 101°; pulse, 100; respirations, 20. Her general physical examination was negative. Red blood cell count, 4,500,000; white blood cell count, 18,000; hæmoglobin, 90 per cent. Widal test negative. Blood cultures were negative.

Genito-urinary examination.—The urine was normal. Kidneys, not palpable; no tenderness in either loin, but some tenderness along the left costal margin anteriorly. No tenderness along the course of either ureter. The bladder was not distended or tender.

The cystoscopic examination by F 24 cystoscope showed the bladder mucosa to be normal throughout; ureteral orifices normal. Both ureters were easily catheterized to the renal pelves. Clear urine of equal concentration was obtained from each side. An x-ray with catheters in position showed the catheters up to renal pelves; no abnormal shadows. Pyelogram (left), (3 c.c. 12 per cent Sod. iodide) showed a normal renal pelvis and normal calyces.

Because of the history and findings a tentative diagnosis of cortical infection with perirenal abscess of the left side was made, and heat applied to the loin. During the ensuing days the patient's temperature gradually rose to 104° each evening, with a pulse as high as 135. At times the loin would be tender and painful and at other times one could make out no localizing signs whatever. The tenderness was always more anteriorly than posteriorly. After waiting ten days it seemed as if there were some fullness in the loin and as the patient appeared more seriously ill operation was decided upon.

Operation.—A small curved left loin incision was made. The muscles were divided and the perirenal fat opened. No pus was seen. The incision was then enlarged so as to completely expose the kidney. This was surrounded by a layer of thickened œdematous fat and was much enlarged. A fluctuating area was found on its anterior surface and an incision here evacuated a large amount of thick pus. The pus had collected

between the kidney and the surrounding layer of thickened fatty capsule to which the peritoneum was inseparably fused. A large portion of this thickened tissue was cut away to expose the central area of the kidney. The surface presented a number of ragged sinuses which exuded pus on pressure. After some hesitation it was decided to remove the kidney. It was separated entirely from within this thickened capsule and the pedicle clamped, cut, and ligated. The wound was closed with drainage.

The specimen showed a large kidney with a bulging engorged area occupying the central portion of its convex border. There were many sinuses exuding pus and several patches of necrosis. On section a localized suppurative area was seen extending deeply into the medulla and with no definite line of cleavage (see Figs. 2 and 3).

Fig. 2.—The specimen showing the carbuncle on its convex border.

Microscopic sections showed the tissue to be largely necrotic and infiltrated with inflammatory cells and exudate. The surrounding tissue showed marked cloudy swelling. Culture gave *Staphylococcus aureus* which, as in Case 1, was hæmolytic.

The patient's recovery was slow because of persistent fever which gradually settled over a period of eight weeks, and the wound, which for a time discharged freely, was healed in about three months. On discharge she was feeling well, but had lost 31 lbs. since admission. There was still a good deal of induration throughout the area of the incision.

ETIOLOGY OF CARBUNCLE OF THE KIDNEY

The condition was thought to be metastatic in origin. Some believe that an infected embolus becomes caught at the point of branching of a small artery. There the embolus becomes broken up and myriads of bacteria are carried to neighbouring parts and a carbuncle results, with its numerous points of suppuration. Barth believed that a few organisms settle at one point, probably due to some obstruction, and that these organisms multiply, spreading along the lymphatics to produce many points of suppuration. Some injury to the kidney, however slight, favours the formation of a carbuncle, as was shown by Schnitzler[12] when he injected cultures into rabbits, and injured the kidney with resulting involvement of that kidney. The subject invariably gives a history of some preceding staphylococcic infection, most commonly boils, although the condition has been noted following osteomyelitis, sore throat, and respiratory infection.

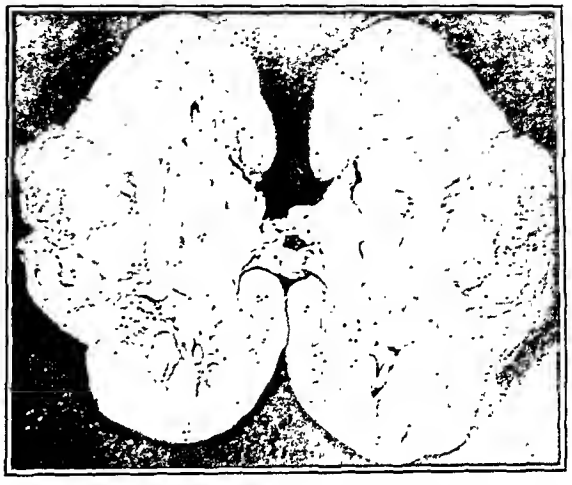

FIG. 3.—The specimen sectioned showing the extent of involvement of the cortex.

In one case it followed a gonorrhœal infection. The condition is most frequently met with in persons 20 to 40 years of age, possibly since these are most exposed to injury. The youngest case on record appeared in a child of 8 weeks, and the oldest in a man of 56 years. The condition is more common in men than in women.

It is a curious fact that in children superficial staphylococcic infections tend to metastasize in bone, causing osteomyelitis, while in adults the metastatic focus is most commonly in the kidney. It is a curious fact, too, that no other pyogenic organism can approach the staphylococcus in its ability to gain a foothold in the renal cortex. Brady calls attention to its ability to split urea and to use its split products for maintenance, and suggests this as the explanation.

When the lesion has started in the cortex it tends always to extend toward the surface, involving the fibrous and even the fatty capsule, with the production of a perinephritic abscess. In advanced cases the cortex may be deeply involved, but the pelvis appears to

possess an immunity and usually remains free of the disease.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis is always a matter of difficulty, and in the majority of cases is not made in the first instance. In the first case typhoid fever had been considered, also miliary tuberculosis, and some acute pulmonary condition. The high leucocyte count and negative blood cultures ruled out typhoid, although the Widal test was confusing. Observation showed definitely that the pulmonary signs were secondary to some condition below the diaphragm. In the second case the diagnosis was more definite, but the pain and tenderness was so variable as to leave one in doubt.

One can recall at the moment 7 operative cases of peri-renal abscess. In 3 the diagnosis was correct, and there was definite cortical involvement. In the fourth case free pus was not found and exposure of the kidney showed only a minute infected cortical cyst. This patient had suffered from fever and most intense pain in the loin, and recovered following drainage of the cyst. The fifth case was operated upon for appendicitis, when a boggy extraperitoneal mass was found. It was found to have its origin in the renal cortex. Later, a perinephric abscess formed on the opposite side. This was also drained, and finally a secondary nephrectomy was performed on the right side by Dr. David MacKenzie. There was a genuine carbuncle which had ruptured into the renal pelvis, a very rare occurrence. In the sixth case the abscess had its origin in a retrocecal appendicitis, and in the seventh it originated in a tuberculous spondylitis.

The most important point in the history of genuine perirenal suppuration is a previous skin infection, usually a carbuncle. All 5 cases gave such a history. This is followed by chills and fever and dull pain and tenderness in the loins. This may continue over weeks and even months, with exacerbations and remissions. The pain and tenderness in the cases reported was so variable that it scarcely focused one's attention on the kidney. The urinary findings are as a rule normal, since these cortical lesions nearly always empty into the perirenal tissue rather than the pelvis. This fact usually enables one easily to differentiate a cortical or a perirenal infection from a pyelonephritis.

In considering the differential diagnosis one must consider the whole question of perirenal suppuration. Infection may reach the perirenal fat in three ways: (1) Directly from the blood stream. This is said by some to be the commonest cause of perirenal abscess. (2) It may result from extension from chronic infection of the kidney, *e.g.*, pyonephrosis or perforation of an area of suppuration in the cortex. This may be relatively small or may be large, as in carbuncles. (3) It occurs as an extension of suppuration from neighbouring structures, *e.g.*, the appendix, duodenum, pleura. It is our impression that the majority of cases of perinephritic abscesses are secondary to infections of the renal cortex. The cystoscopic findings are not of any great help in most cases, the ureteral specimens of urine being normal. The relative functional tests may show diminished activity on the affected side. The phthalein test is said to be of special value. This test was not carried out in our cases, but the urea concentration was equal at the time of examination. The pyelogram of our first case showed an elongated upper calyx, but it was considered to be a type of normal pelvis; similarly the lumbar portion of the ureter showed a slight dilatation, but yet not definitely beyond the normal limit. Brady mentions the elongation of the upper calyx in his case, and Patch points out that filling defects were present in his cases and he believes them to be characteristic. An examination of the specimen removed in our first case leaves little doubt but that there would have been a definite filling defect in a pyelogram made just prior to operation. In the second case, however, the pyelogram made ten days before operation was entirely normal and the upper calyx was not elongated.

We would again stress the importance of enquiring into the history of skin infections. They frequently clear up before the renal involvement; the patient does not offer the information, and thus the point of most diagnostic importance may be overlooked. In one of our cases this information did not appear in the original history and had subsequently to be extracted. The fact that these staphylococcic infections in children tend to metastasize in bone has been mentioned, but it is to be remembered

that such metastases may occur in the kidneys as in adults and may present exactly similar problems. Two such cases have recently been reported by Campbell.[4]

TREATMENT

The treatment also concerns the whole question of perirenal suppuration, since it is this manifestation that brings the patient to the operating room, and it is only here that the exact nature and extent of the lesion can be determined. At least we know of no means, other than operative, whereby one can gain any adequate idea of the cortical involvement. There are those who advocate conservative and those who favour more radical surgical procedure. It is our impression that conservative treatment should first be tried in every case where a localized abscess has formed. A small incision is made in the loin and the pus is freely evacuated. The cavity can be carefully explored with the finger so as to break down any barriers which might interfere with free drainage, and at the same time a more or less accurate idea of the lesion is obtained. In the first case we report one could make out a large space beneath the diaphragm, and the upper pole of the kidney appeared to be involved; nothing more definite could be said at the time of preliminary drainage. A large drainage tube is left in and in a number of cases this will be sufficient to permit of recovery. If, as in this case, the patient does not promptly improve it may then be assumed the lesion is more deep-seated, (if the disease has not become bilateral) and a more radical operation must be undertaken. The kidney must be exposed and if a deep or extensive lesion is present nephrectomy is indicated. Neff[9] records two cases where he was able to enucleate the carbuncle and this operation has been successfully performed by others. When it is possible it is ideally conservative, but its usefulness must of necessity be limited to a small number of cases. In one of our cases there was near the surface a definite line of cleavage, but deeper down it was entirely absent and it could not under any circumstances have been demonstrated with the kidney *in situ*.

Israel,[6] Reschke, and others recommend resection of the carbuncle as a feasible procedure, but one would not care to attempt it in a patient who was very ill. In Brady's case the carbuncle occupied the lower half of the anterior surface of the kidney and he states that it could not have been excised. He simply incised the kidney capsule widely and provided free drainage. Irrigation with a staphylococcal bacteriophage were carried out afterwards and appeared to be of benefit. One wonders if the carbuncles in which enucleation is possible might not separate spontaneously in the same way if adequate drainage is provided.

Neff,[9] Campbell[4] and Brady have all analyzed the various methods of treatment from a statistical viewpoint, but their conclusions do not exactly coincide. It would appear that primary nephrectomy, the most radical, is the safest procedure, but it is our own opinion that it is only justifiable when the patient is acutely ill and it is essential to remove as much of the infected tissue as possible, or when there is extensive kidney damage of a deeply-seated nature. We feel that in all other cases conservative treatment is worthy of trial first. By this we mean free and prolonged drainage, and we include cases in which enucleation, incision or resection is applicable. Each case must be treated on its own merits, the guiding factors being the general condition of the patient and the extent of renal involvement. The first factor is of utmost importance, and is at once apparent, but the second is accurately revealed only at operation and one's individual judgment must then be the guiding factor.

We wish to thank Dr. W. D. Hay for his careful preparation of the photographs.

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TRANSPLANTATION OF THE LACRIMAL SAC IN CHRONIC SUPPURATIVE DACRYOCYSTITIS*

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ALL ophthalmologists recognize that excision of the lacrimal sac is a most effective operation for the removal of suppuration in dacryocystitis. Nevertheless, the discomfort from tearing which frequently follows, even after removal of the accessory lacrimal gland, has induced various surgeons to attempt, by more conservative means, to overcome the suppuration by re-establishing lacrimal drainage.

The first of these methods was the "dacryocysto-rhinostomie" of Toti,[1] which was described by him in 1904, and has since been modified by others, especially Dupuy-Dutemps,[2] and Mosher.[3] In 1910, West,[4] advocated his intra-nasal operation, although this route had been used first by Caldwell[5] in 1893. Since then various modifications of this operation have also been described. In 1919 Dr. Gordon Byers, my Chief in the Department of Ophthalmology at the Royal Victoria Hospital, Montreal, assigned to me all lacrimal cases suitable for the West operation, with a view to incorporating this more conservative procedure in our practice, if justified by results. After having carried this out on a series of cases it occurred to me that if one could incise the lacrimal sac transversely just above the obstruction and transplant its end into the nose through a new opening in the lacrimal fossa, one would have an epithelial lining to insure patency. This idea was carried out and I made a preliminary report on the method in June, 1921.[6]

As the procedure at present is somewhat simpler than that previously described, a brief description of it as now carried out is as follows.

A skin incision from 12 to 15 mm. in length is made, extending from the median palpebral ligament down and slightly outward, following the direction of the anterior lacrimal crest (Fig. 1). As this crest is continuous below with the orbital margin the direction is easily followed. The orbicularis muscle is then split, exposing the sac covered by fascia. The median palpebral ligament and its attachment is an infallible guide, as the sac lies immediately behind it (Fig. 3). The further dissection is carried on below the ligament which is left intact, thus also sparing the canaliculi. After the sac is well exposed it is freed anteriorly and posteriorly by dividing the fascia. In large dilated sacs the procedure is easy, as the fascia is much thinner, while in narrower sacs one has to divide the fascia vertically along the anterior and posterior crests, allowing it to remain attached to the outer wall of the sac. This is left *in situ* to hold a suture which is to be inserted. The sac is now freed down to the entrance of the canal, where it is cut completely across (Fig. 4). A stout silk suture is then passed through the fascia and the outer sac wall and the sac is lifted upwards with a retractor so that the lacrimal fossa is exposed. An opening is next made into the nose through the fossa. As a rule, a portion of two bones constitutes the fossa,—the anterior portion being formed by the frontal process of the superior maxilla, which is dense, while the thin lacrimal bone forms its posterior part (Fig. 2). I shall mention later the variations in this respect. A punctum dilator easily perforates the lacrimal bone high up near the median palpebral ligament, and the opening is then enlarged with the blunt end until big enough to admit the sac (3-4 mm. in diameter). Both ends of the silk suture can now be passed through the opening into the nose and picked up by a pair of nasal forceps. This is often difficult, as the opening is high up under the anterior end of the middle turbinate. I have found it easier to pass a fine filiform bougie through the opening so that it slips backwards under the middle turbinate and appears in the pharynx. A rubber catheter is now passed through the nostril of the same side until it also reaches the pharynx (Fig. 6). Both are withdrawn from the mouth and tied together. On drawing the catheter from the nostril it is followed by the filiform bougie and then the suture which has been tied to it. Once the suture comes out of the nostril it is drawn firmly and the sac is

* Read at 63rd annual meeting, Canadian Medical Association, Section of Ophthalmology, Toronto, June 23, 1932.

inserted into the new opening. By tying the two ends of the suture over a piece of gauze inserted into the nostril for the purpose the sac is held in the opening (Figs. 5 and 7). Three skin sutures are inserted, a pad of gauze is placed over the incision, and then a firm bandage applied.

The plug in the nose may be changed on the second day to avoid odour, and removed completely on the fifth day, when the sac suture may also be withdrawn and the skin sutures removed. The lacrimal syringe may be used, but if all is clean about the wound this may be left for another week.

The operation is carried out under local anæsthesia. A line is taken between the infra-orbital foramen and the inner canthus, and 2 c.c. of a 2 per cent novocaine-adrenalin solution are injected, at about the junction of the lower and middle thirds of this line, which catches the branches of the infra-orbital nerve going to the lacrimal sac region. About 5 minims of the

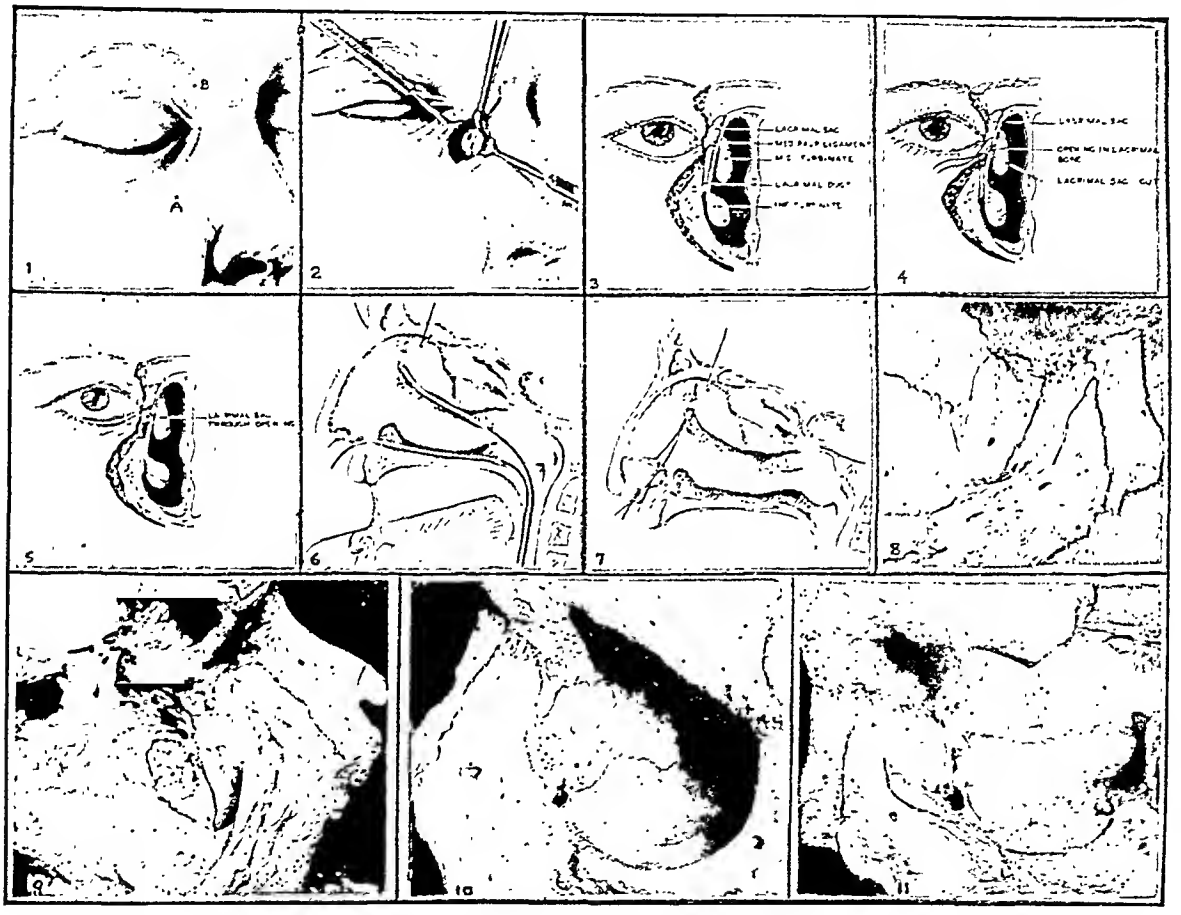

Fig. 1.—*Skin incision. A and B—injection points for local anæsthetic.*

Fig. 2.—Lacrimal fossa exposed, with opening made in lacrimal bone after sac has been cut and drawn upwards.

Fig. 3.—Vertical cross section showing normal relations in the lacrimal region.

Fig. 4.—Vertical cross section showing suture in the sac after it has been cut across, and the new opening into the nose.

Fig. 5.—Vertical cross section of the lacrimal sac through opening.

Fig. 6.—Sagittal section showing bougie through opening extending into the pharynx, and catheter in the inferior meatus. The middle turbinate has been lifted upwards.

Fig. 7.—Same as No. 6, but with lacrimal sac through opening, and suture tied over gauze in the nostril.

Fig. 8.—Lateral view of the lacrimal fossa showing suture between the frontal process of the superior maxilla and lacrimal bone in the centre of the fossa. Each bone forms half the fossa.

Fig. 9.—Same as No. 8, but suture is far back near the posterior lacrimal crest, so that fossa is formed by the superior maxilla.

Fig. 10.—Same as No. 8, but suture is far forward so that lacrimal bone forms almost entire fossa.

Fig. 11.—Absence of lacrimal bone.

same solution are injected subcutaneously, fairly high up, in the inner angle of the orbit, to catch the supra and infra-trochlear branches coming down (Fig. 1). A pledget of cotton-wool, squeezed dry of a 10 per cent solution of cocaine and adrenalin, is placed high up under the anterior end of the middle turbinate. It is also well to give a hypodermic injection of morphia, grain ¼, before the operation.

Since November, 1920, 25 operations of this type were performed on 23 patients; 11 were in males, and 12 in females. Twelve were on the left side, and 13 on the right. The youngest patient was 22 years of age, and the oldest 62. Of this number, 16 were done before December, 1921, and only 9 since then. This is due to the fact that I partially lost interest, but this interest was revived by the enthusiasm of some of the patients, especially so by that of one man who had this procedure on one side, and an excision performed on the opposite side. In 1923 I collected the results of the 16 cases, and found that 10 were cured, that is, there was no discharge and no tearing, with normal lacrimal patency. Three were improved, with little or no discharge, but with tearing and no patency with the syringe except after probing, and 3 were failures. In one of the failures ectropion immediately followed the operation, and it was, I think, responsible for the failure. The ectropion was probably caused by a detachment of Hoerner's muscle from the posterior crest, occurring while freeing the sac—an unusual and unnecessary accident. The sac was afterwards excised. In this series of 16 cases no attempt at selection was made before operating. The patients were operated on in the order that they appeared at the clinic, but as a result of my experience with the series I feel that certain types are more suitable for this particular operation. The chronic cases with large sacs, that is, those from which a large amount of pus regurgitates on pressure, seemed to be the most satisfactory. The reason is that here the lumen of the sac is large, its walls are thick, and the obstruction is low down. The 9 cases done since 1923 were of this type and the results are as follows. Seven are completely well and have been seen or heard from lately. The most recent was operated on ten months ago. One has not been heard from, but was well when last seen, and the other is improved. This patient has a blocking at times which is easily relieved by probing. In this last case the bony opening made at the operation was small, although it was as large as I could make with the punctum dilator. This led me to make further investigation on the bony relations of the lacrimal fossa. As stated above, the anterior part is formed by the frontal process of the superior maxilla. It is dense and impossible to perforate with a punctum dilator, while the posterior part, which is formed by lacrimal bone, is as thin as paper. I formerly thought that each bone formed half the fossa; but on examining one hundred and six lacrimal fossæ in the Department of Anatomy at McGill University* I found that in 78 the suture between the two bones was in the centre of the lacrimal fossa (Fig. 8). In 19 the suture was far back so that the whole inner wall of the fossa was formed by the frontal process of the superior maxilla (Fig. 9). In 8 the whole inner wall was formed by the lacrimal bone (Fig. 10), and in one skull the lacrimal bone was absent (Fig. 11). These figures do not vary greatly from Whitnall's findings.[7] It can be seen that in the cases where the superior maxilla forms the inner wall it would be difficult to make an opening large enough to admit the sac without resorting to a burr or chisel, which I have not used up to the present. I think this is responsible for the one failure in the last 9 cases.

The advantages of this procedure seem to be that it is simpler than the external routes described. Moreover, less bone is removed and no flaps of mucous membrane have to be dealt with. It is quite in the field of ophthalmology, so that no profound knowledge of nasal work is required, as in the intra-nasal operation. Finally, after having started the operation, if the procedure cannot be accomplished successfully, the sac may be removed through the same incision.

I want to thank Professor S. E. Whitnall of the Department of Anatomy at McGill University for his kindness in providing me with anatomical material, and also for valuable suggestions.

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* The specimens are in the collection of cranial bones made by Dr. H. E. MacDermot.

THE USE OF AVERTIN IN MULTIPLE DRESSINGS: EFFECTS ON THE LIVER*

By L. H. McKim, M.D., F.R.C.S.(C.) and Wesley Bourne, M.D., F.R.C.P.(C.),

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IT has been well established by experimental work that the repeated administration of avertin causes no damage to the liver. The investgations on this point, however, have been carried out only on dogs. So far, no observations have been made on human beings, and it is therefore of considerable interest to publish a case which has provided both clinical and laboratory data regarding the effect of this anæsthetic on the liver. It is equally striking as an example of the value of avertin in carrying out repeated surgical dressings of an extensive nature.

Case Report

The patient, H.L., a male aged 37 years, was admitted to the Western Hospital on June 28th, 1932, with an infected wound of the right thigh.

History of illness.—On June 25th, in a motorcycle accident, he had received a small wound of the right thigh a short distance above the knee. He was taken to another hospital where this wound was closed by three silkworm gut sutures and two skin clips; he was also given 1,500 units of antitetanic serum. He was ordered to return to the hospital two days later, but was too sick to do so and was finally admitted to the Western Division of the Montreal General Hospital.

Condition on admission.—Temperature 101.4°; pulse 84; respirations 24. There was great swelling of the entire leg from the gluteal region to the ankle. On the outer aspect of the thigh, about 4 inches above the knee-joint, there was a transverse wound about 2½ inches in length, tightly closed with sutures and clips. Immediately surrounding the wound the skin was reddened and inflamed for a distance of two or three inches. Beyond this area the skin, which was very tense, showed a brownish discoloration slightly decreasing in intensity as it approached the limits of the area of swelling. This discoloration appeared on the outer side of the leg only. No crepitations could be felt in any part of the leg. The patient complained of great pain.

On June 28th, under avertin anæsthesia, supplemented by nitrous oxide and oxygen, the wound was opened by the removal of the sutures and skin clips. A quantity of watery blood-stained fluid immediately poured out of the wound. There appeared to be some gas-formation in the cavity, but no crepitation could be felt in the tissues. The wound was explored by dividing the skin in both upward and downward directions. It was found that the original injury had involved the deep fascia and the muscles on the outer side of the thigh for a distance of at least six to eight inches in an inward and upward direction. The damaged muscle tissue had apparently undergone partial liquefaction. Although great destruction had gone on there was little or no odour. Beneath the skin the subcutaneous tissue was grayish and necrotic, and, on being divided, exuded a watery semi-purulent fluid. The tendency to spread appeared to be along the line of junction of the superficial and deep fascia. On dividing the deep fascia, which was under very considerable tension, the muscles protruded through the opening. It was then found that the infection was spreading along the deep fascial planes. The infection involved both the posterior and external intermuscular compartments. The internal aspect of the thigh (adductor) compartment was apparently not involved. The wound was extended upwards to the gluteal region and downwards to the ankle dividing the deep fascia throughout the entire thigh and the middle two-thirds of the lower leg. There was practically no bleeding. A large quantity of damaged muscle tissue in the thigh was cut away and the entire wound was packed with gauze soaked in an aqueous solution of acriflavine (1-1000). Cultures showed a non-hæmolytic streptococcus.

Subsequent progress.—Following the operation he was given intravenous injections of glucose. On June 30th, under avertin anæsthesia, the packing was removed and the incision extended slightly in both directions. The Carrell-Dakin treatment was instituted, and carried out for about four days, until the surrounding skin began to show irritation from the solution. At this time the irrigating fluid was changed from Dakin's to acriflavine (1-2000). Dressings were done under avertin anæsthesia at intervals of two to four days from this time onwards. Blood transfusions were given on July 2nd, 6th and 29th. On July 11th it was found necessary to extend the incision to include the dorsum of the foot. On July 20th the entire wound had begun to granulate and was partially closed in the upper part of the thigh and in the calf with stay-sutures of silkworm gut over rubber tubing. On July 26th the knee-joint was found to be involved in the infective process. X-ray examination showed roughening of the articular cartilage, suggestive of an arthritis with absorption. The supra-patellar pouch was opened on the outer side. No exploration of the knee-joint was carried out. Slight movement of the knee produced a discharge of a large quantity of pus. This wound was dressed every two or three hours with slightly applied fluffy gauze dressing. A subcutaneous abscess on the inner side of the thigh about six inches above the knee-joint was incised

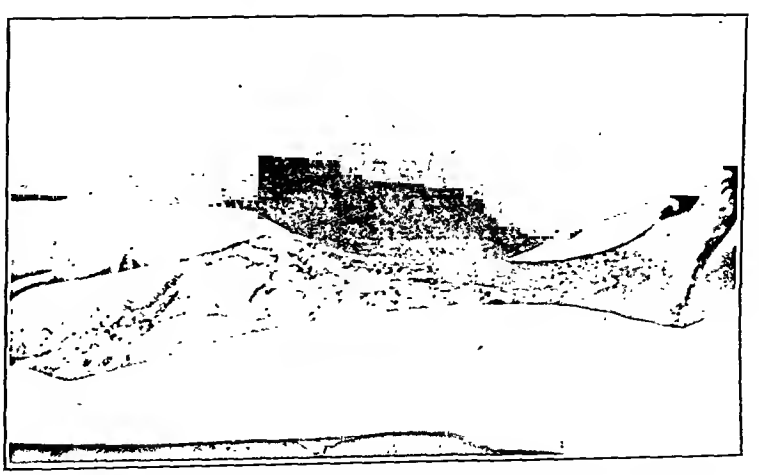

Fig. 1.—This figure shows the length of the incision and the area above the knee filled in with grafts.

*Presented before The Montreal Medico-Chirurgical Society. Nov. 18, 1932.

the same day. Packing of the cavity on the outer side of the thigh, with acriflavine irrigations, was continued until about August 15th. On August 23rd the discharge from the knee-joint had ceased and the cavity in the thigh had filled up sufficiently to permit skin grafting, which was successful. Final examination with some manipulation of the knee and ankle joints was carried out under avertin anæsthesia on September 1st, making a total of twenty-two administrations of avertin to this patient over the period between June 28th and September 1st.

Present condition (Nov. 10th). There is about 10 to 15 degrees movement in the knee-joint; movement of the ankle joint about 60 per cent of normal. The man is able to walk with the assistance of a cane. There is some

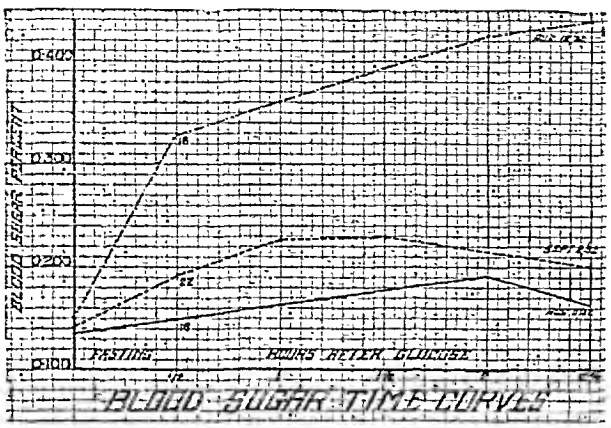

CHART I.—The numbers 18, 18 and 22 indicate the number of doses of avertin given to the same case.

pain in the knee on weight bearing, but this is rapidly decreasing, and it is felt that he will have a functionally useful limb, though possibly with a good deal of limitation of knee-movement. The disability, of course, will be materially increased by the actual loss of muscular tissue at the site of injury.

We feel sure that with no other form of anæsthesia could the dressings have been accomplished with so little shock and discomfort of the patient. As a rule he slept for a period of three to four hours after the dressing and until the pain from the actual handling of the tissues had subsided.

It would appear to us that while there has been a great deal of discussion as to the use of avertin as an adjunct in general anæsthesia, its value in this type of case has been largely overlooked. We regard its use in this particular case as a life-saving proeedure.

THE EFFECTS OF AVERTIN ON THE LIVER

It has already been shown that "repeated administration of avertin in normal dogs produees only a mild parenchymatous degeneration of the liver and kidneys; fatty changes in the liver occur occasionally. When they do oecur, they are very slight; and no histological changes oceur in the heart following repeated avertin anæsthesia."[1,2] Nevertheless, this ease affords an exeeptional opportunity of making some important observations on its effeets in man. Table I furnishes the details. It will be noted that the dose was frequently redueed on account

TABLE I.

ADMINISTRATION OF AVERTIN TWENTY-TWO TIMES TO ONE MAN: STATED WEIGHT, 154 LBS.

Date 1932	*Nature of Case*	*Dose*	*Remarks*
June 28	Operation—extensive incision	7.0 g.	Nitrous oxide
June 30 to July 4	Three dressings	6.2 g.	None
July 6 to July 17	Five dressings	6.8 g.	
July 20 to July 26	Three dressings	7.0 g.	
July 29 to Sept. 1	Ten dressings	6.0 g.	August 23rd—skin graft.

TABLE II.

LIVER FUNCTION TESTS.
TWENTY-FOUR HOURS AFTER AVERTIN.

Date 1932	*Number of times avertin given*	*Amount of bromsulphalein per kg.*	*Dye retention ½ hr. after injection*
Aug. 9	17	2.5 mg.	0
Aug. 11*	18	3.0 mg.	0
Aug. 30	21	5.0 mg.	10-
Sept. 2	22	5.0 mg.	5-

*Urobilinogen $\frac{1}{133}$

of the asthenia which developed. There was no evidenee of toleranee for the drug and no tendency to habit formation.

The liver is sueh an important strueture that any measure of the action of a drug on this organ may be taken as good evidence of what is going on concurrently in the rest of the body. Thus it is that the bromsulphalein dye test[3] was carried out, pigment metabolism was partially investigated, and some sugar tolerance determinations were made. Table II supplies the results with the dye, and it will be seen that even after twenty-two doses of avertin there was practically no dye-retention, which compares very favourably with the action of one dose of this or any other anæsthetic agent.[4,5,6] It will also be seen that after the eighteenth instanee of the use of avertin, there was an exeess of urobilinogen in the urine. This faet and the blood sugar time eurves of Fig. 1 are explained by a metabolism report of Dr. I. M. Rabinowiteh (Montreal General Hospital), as follows:—

The metabolic data suggested some disturbance of liver function on August 11th; an excess of urobilinogen was found in the urine. The local surgical lesion, however, and the general condition of the patient were alone

sufficient to account for this finding. This also applies to the blood sugar time-curves, all of which indicated disturbance of carbohydrate metabolism. There was infection, and it is a well recognized fact that infection may *per se* interfere with the storage of glycogen in the liver and muscles and account for such curves. Further suggestive that the disturbance was due to the general condition of the patient rather than the anæsthetic is the fact that *the different degrees of disturbance were not related to the number of anæsthetics*. For example, the blood sugar time-curve obtained after twenty-two anæsthetics indicated much less disturbance than that obtained after eighteen anæsthetics.

To summarize, therefore, avertin, if it is harmful at all, should, according to its chemical structure, cause disturbance of liver function. In this case, in which the patient was exposed to the anæsthetic twenty-two times, there is no evidence of this having occurred. All of the laboratory data can be readily explained by the local lesion and the general condition of the patient. It is my opinion, however, that avertin should be used with care in the presence of an obviously damaged liver (jaundice, etc.). Medicine affords numerous examples of a drug being harmless in the normal, but very harmful in the abnormal, individual. The harmful effects of arsenic in syphilis complicated by gross liver disease is an example.

It might be said that perhaps the difference between the blood sugar curves of August 11th and August 12th is due to delayed liver poisoning and that more determinations should have been made. We admit the point, but it was difficult to get specimens of blood on account of the man's wasted condition. With respect to the former, we are inclined to agree with Dr. Rabinowitch—all the more so in view of the findings with the bromsulphalein dye retention test, which has quite recently been shown to be most valuable in estimating liver function in man.[7]

CONCLUSIONS

1. A case of severe infection of the leg is reported.
2. The value of avertin in painful dressings is emphasized.
3. Avertin was administered to one individual on twenty-two occasions over a period of less than ten weeks.
4. Functional tests showed no appreciable liver damage.

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CLINICAL EXPERIENCES WITH AVERTIN ANÆSTHESIA*

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THIS paper deals with the administration of avertin in 25 cases at St. Michael's Hospital during the past six months. I am indebted to Dr. J. F. L. Killoran for the use of the department records and to Dr. H. S. Douglas, who first introduced the drug in our operating room, for the privilege not only of including 11 of his cases but also of presenting to you the conclusions at which we have jointly arrived. The number of cases is small, but they are being presented to arouse discussion. We used the drug in a more or less skeptical frame of mind, holding no brief for it nor prejudice against it, and we have been rather pleasantly surprised at the results.

Broadly, our belief is that avertin is a very powerful drug, fairly uniform in its action, but showing at times effects which cannot be accurately predicted. Used in moderate dosage and in certain types of cases in which full muscular relaxation is not essential, such as operations around the head, neck, chest and extremities, we believe that it has many advantages which allow it to at least approach the ideal sedative. It eliminates all immediate pre-anæsthetic apprehension, and so far diminishes the amount of nitrous oxide necessary as to add greatly to the safety of the patient and the peace of mind of the anæsthetist. We have had few experiences to detract from its virtues on the table, despite the fact that it is a strong respiratory depressant. The post-operative course is generally satisfactory, although there is sometimes for 2 to 6 hours a restlessness requiring large doses of morphine. Despite the apparent distress of the patient at this time, there is frequently an entire lack of later recollection of this normally painful period. Recovery has been complete in 2 to 6 hours from injection, and even after accurate post-

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operative observations and chemical investigations we have seen nothing in the nature of a serious complication. These findings are in harmony with those described in the great majority of recent publications.

In fairness to the drug, it is of great importance to remember that we are now in a second era of its use—vastly different from the introductory period during which deaths and complications occurred with alarming frequency. When first introduced in Germany in 1926 it was given in improperly prepared solutions of the powder, and in very large doses, the aim being to obtain complete anæsthesia by it alone. Many deaths occurred; twelve are definitely attributed to avertin poisoning and twice that number are listed as doubtful. Sloughing of the rectum also occurred, as well as other unpleasant sequelæ, which quite properly brought the drug into disfavour, or, rather, brought that method of using the drug into disfavour. To-day, we are using a stabilized, concentrated solution, carefully prepared, and given in very much smaller doses, with the object only of *assisting* some general anæsthetic and not of *replacing* it. Avertin is looked upon merely as a sedative, an unusually strong sedative, it is true, but nevertheless, a sedative.

Before undertaking any extensive use of the drug, we reviewed all articles published during the past two years in five of the leading journals. We found data on 4,000 cases by 46 authors. An overwhelming majority of reports were favourable. Half the writers, basing their opinions on half the cases, were actually enthusiastic. An additional 17, dealing with over 1,900 cases, were definitely favourable. Of the remaining 6 writers; 1 made adverse comments after using it in 35 cases; 3 were pessimistic, without giving any details, and 2 had definitely bad results in 1 case each. In such bad cases, death occurred 6 to 10 hours after doses of 80 and 100 mgrm of avertin *plus morphine gr.* ¼, a combination which is very largely condemned, and which has been in our experience also deemed unsafe. One of them, a man aged 94, had a gall-bladder operation lasting three hours, with an outside temperature of 103° in the shade, and death was stated to be due to thermic fever, rather than avertin poisoning. The other would appear to be definitely a case of poisoning from avertin plus morphine in a young man in good health, operated on for simple hernia. He did not regain consciousness and died in 6 hours from respiratory failure. What would have been the result without morphine cannot, of course, be stated, but its use was not in keeping with modern technique and really removes these cases from the category of the safer procedures upon which our experience has been based.

Thus it will be seen that the story of avertin, used in the newer manner, is entirely different from that of a few years ago. The early observations should not be held against results with the present methods. No doubt many deaths followed the introduction of morphine as a sedative, but they are not to-day held to detract from its value when used in accordance with present knowledge. Just so here, mistakes made during the experimental period of avertin should not be held against the records being established by to-day's technique. Unquestionably they are a warning—and a grave warning—against the use of it in the former doses, but by themselves they are not a contraindication to the use of the drug in a manner which is apparently preventing a recurrence of such serious results.

The method of administration is really very simple, despite the fact that the dose is calculated in milligrams per kilo. of body weight and is administered, by rectum, in a 2½ per cent solution at a temperature of 104° F. Actually, it is no more troublesome than an ordinary ether induction, and requires no apparatus not normally available in any operating room. Accompanying each trade package, is a table of dosages, giving the exact amount of avertin fluid to be used, with the correct volume of distilled water for all body weights from 22 lbs. to 220 lbs., based on any desired dose from 60 to 100 mgrm. per kilo. The stated amount of distilled water is heated in a flask under the hot water tap to a temperature between 100 and 104° F. The avertin fluid is added to the water, using a pipette graduated in tenths of a c.c. It is a clear oily liquid, which sinks to the bottom, but readily dissolves on shaking for a moment. If the water is much below 100 degrees, precipitation occurs, and the solution should, presumably, be discarded.

If heated above 104 degrees, it decomposes to form hydrobromic acid and dibromacetaldehyde. It is the latter which will cause colonic irritation. Its presence can be readily detected by testing for the accompanying hydrobromic acid by placing a few c.c. of the prepared solution in a test tube, and adding a few drops of the congo-red test solution provided in each package. If decomposition has occurred, the acid turns the congo red a deep blue, showing the solution to be unsafe. If it remains orange-red, injection is immediately made, using a funnel attached to a small rectal tube, inserted about four inches. The average volume will be in the neighbourhood of 250 c.c.; for instance, the full dose of 100 mgrm. for a 150 lb. man is 6.8 c.c. of avertin fluid in 272 c.c. of water. We have encountered no difficulty in running this in, in from 3 to 5 minutes, even where there has been no preliminary enema, although one probably aids absorption. In only two cases was any expelled before sleep set in, and in no case was there any complaint of rectal irritation at the time or later. Where fear of operation is a prominent feature, the injection is best given in the patient's room. The best results are obtained by leaving the patient absolutely undisturbed until well asleep, rarely longer than 15 minutes, when he may be lifted to the stretcher and wheeled to the operating room direct. This transportation seems to interfere less with a smooth onset than the hurry accompanying the wait on the operating floor, where the surgeon may urge too early a start of the necessary supplemental anæsthetic.

Of our 25 cases, 10 (or 40 per cent) reacted in what may be termed an entirely ideal manner, showing a smooth onset, soothing even to the wildest thyroid patient, and permitting the use of an amount of nitrous oxide (without ether) so small as to greatly decrease the danger to the patient, while adding to the comfort of the anæsthetist. There was no significant change in the respirations, pulse or blood pressure, and return to consciousness was rapid, quiet and accompanied by sufficient amnesia to remove a great part of the horror of the first twenty-four hours. This is a high standard, but cases which departed from that ideal in even one detail, have been classed as "abnormal", even if their behaviour was merely unexpected, without being alarming. Actually, the net result in 88 per cent of our cases was safe and satisfactory, as only three showed symptoms at all dangerous, and in no instance was the end-result harmful.

Except with 3 patients, we have used no other preliminary sedative, and we believe that it would be a mistake to add any depressing sedative to the very definite depression of the avertin itself. We give atropine, gr. 1/150, twenty minutes before the avertin. When it was inadvertently omitted, along with the usual morphine, we had considerable trouble with excess mucus. The rate of injection does not seem to have any great influence. We have standardized it at approximately 50 c.c. per minute, thus occupying 3 to 5 minutes.

The drug acts with spectacular rapidity. In 7 to 10 minutes from the start of injection, drowsiness sets in. The quiet patient lapses into an apparently normal sleep, without comment; the talkative patient becomes slightly confused. Often there is some euphoria, but never any excitement. All conversation is in a normal tone and of a pleasant type. A moment or two of this and he is definitely asleep. 10 to 15 minutes from the start of injection. From the standpoint of the comfort of the patient this manner of losing consciousness is much easier than any inhalation induction. Perfect unconsciousness steals upon him unawares, without mental or physical distress. Sleep steadily deepens, until twenty minutes after the start a definite stertorous snore is heard. He is then deeply unconscious and cannot be roused to any voluntary activity. If left alone, the pulse remains the same or is slightly accelerated; the pupil is almost pin-point and movement of the ball sluggish or absent; respirations become even, regular and a little slower and more shallow than normal. The general picture is that resulting from a large dose of morphine. In half our cases the colour remained perfectly good; in the balance there was some slight cyanosis. In the cases here being described as normal, this was immediately relieved by deepening the respirations, either with oxygen and carbon dioxide, or simply by moving the patient to the table and disturbing his too peaceful slumber. Similarly at this stage there is a fall in blood pressure of 20 to 30 points, which is likewise immediately over-

come by increased respirations. With the deeper breathing, in 80 per cent of *all* cases, the blood pressure rose to a higher level than that at the start, and the face became unusually flushed. In a number of cases we gave oxygen and carbon dioxide for two minutes, raising the pressure 15 to 20 points, and restoring normal colour; then we cut off the mixture, allowing the patient to sink back into his depressed state, and repeated the whole cycle several times at will. We believe that this proves the slight cyanosis and fall in pressure to be due to the slow, shallow respirations, and when moderate, to afford no cause for worry. At this stage the jaw is completely relaxed and the tongue drops back as readily as in a patient who has been under ether for an hour. Cyanosis from this cause must of course be guarded against just as vigilantly as in the recovering ether-patient. An airway may be readily introduced, although there may be some gagging, but never any vomiting. The patient may or may not lie quietly during the pre-operative preparation at this time, 20 to 25 minutes from the start of injection, for, despite his apparently very deep sleep, he responds reflexly to pain and touch and some supplemental anæsthetic must be started. We believe that the patient who will tolerate even a skin incision has received an overdose and will show later some untoward symptom. This is important. We have made no attempt whatsoever to obtain surgical anæsthesia by avertin alone, and in the one instance in which it did occur we considered the result undesirable. Avertin is purely a pre-anæsthetic sedative, having the very great advantage of acting so quickly that the patient is swept into unconsciousness before he has time to worry.

This brings us to the second strong point in its favour—the astonishingly small amount of supplemental anæsthetic needed — an amount so small, in the case of nitrous oxide, that it removes any possibility of the patient suffering from the slightest oxygen want. One of the most striking things in the use of the drug is to see a thyroidectomy done, with the patient receiving 70 per cent oxygen for 30 to 50 minutes at a stretch, without the slightest semblance of undue lightness, and then to watch the effect of increasing the oxygen to 100 per cent, depending on the avertin alone, and see him, in less than two minutes, rolling and twisting on the table, perfectly unconscious, but entirely unmanageable due to reflex activity. Fortunately, there is practically never any vomiting with this lightness, and seldom any coughing. That is a constant phenomenon, noticed in all our cases. The amount of oxygen which he would tolerate varied with the type of operation, but the restoration of what would, normally, be an entirely inadequate percentage of nitrous oxide would again restore quiet, even anæsthesia. In no case (of our 10 normal ones) did the patient receive less than 20 per cent oxygen after the initial induction. From then on the percentage of oxygen could be steadily increased — an additional 5 per cent every 5 minutes—until at 60 to 70 per cent of oxygen a point was reached beyond which he became light. That of course is an arbitrary method, but one which we found helpful in compiling records and one which was of great value in convincing the hospital authorities that the expense of the avertin was largely neutralized by the saving in gas. The cost of nitrous oxide is three to four times that of oxygen, and if we can carry a patient throughout on an average of 50 per cent nitrous oxide instead of 85 to 90 per cent, then there is a saving almost equal to the cost of the avertin, which at present is about $1.50 per patient. That is important, for we have been restricted in the use of the drug more by the cost than by any clinical contraindication. Further saving is accomplished by the low pressures used. In very few cases was a pressure greater than 3 mm. of mercury needed, and, with re-breathing, no added carbon dioxide was required.

One other tremendous advantage, and one of which we have seen no mention in any literature reviewed, is that it allows the use of intratracheal nitrous oxide, without ether at any stage. The accepted method is apparently to follow a gas induction with enough ether to obtain relaxation of the jaw, sufficient to admit the laryngoscope, after which, the nitrous oxide-oxygen is continued alone. But that ounce or two of ether is very often highly undesirable, even although it undoubtedly smooths the course of later anæsthesia, in addition to permitting intubation. With avertin it is almost always unnecessary. Four of our good

cases were intratracheal ones, in which the catheter was introduced easily under the influence of avertin alone, and without even any nitrous oxide. This early and complete relaxation of the jaw is strikingly constant and in contrast to the lack of relaxation of other muscles. Even in cases in which the intratracheal method was not desired, we carried out sufficient manipulation with an airway or laryngoscope to convince us that in 80 per cent of all cases the catheter could have been introduced with no more difficulty than is encountered at the end of 15 minutes of straight ether. Add to this that because of the very high oxygen percentages smaller volumes of gas were used (at the stated pressure of 3 mm.), and the procedure seems to possess definite advantages over the more common methods of using intratracheal gas. In our cases there was no bleeding in the mouth and so the low pressure was permissible. Of course, if bleeding is present higher pressures must be used, if this is being depended upon to prevent aspiration of blood.

In our normal cases, respirations were quiet, regular and peaceful. The colour was unusually good. The blood pressure, after the initial fall associated with undisturbed sleep, came to normal, or 10 points above, and remained there until the severity of the operative manipulation resulted in a fall, which almost always was less severe than would be expected in that particular operation. In none of these cases did it occasion alarm, and it responded well to ephedrine, coramine, or intravenous glucose.

The duration of the full sedative effect was about 1½ to 2 hours from injection, at the end of which time more anæsthetic was sometimes necessary, or, if the operation was complete, consciousness returned. Our average operating time was 1 to 2 hours, the longest being 3½ hours, with the total time under avertin ranging from 1 to 3 hours, the longest being 4 hours. The average patient answered questions before leaving the operating room or shortly after, that is, 2 to 4 hours from the injection, and was fully rational in 2 to 6 hours after the injection. Generally, recovery was complete as soon as would be expected with the usual gas-ether combination for that type of operation. In our normal cases, recovery was calm and peaceful, with practically no vomiting, and, despite the fact that he might answer questions intelligently, the patient later showed little recollection of the conversation or the immediate post-operative period. This amnesia was quite striking in some cases but not nearly so constant as some writers mention. There was no rectal irritation in any case and no difficulty in giving a retention enema immediately after operation, when necessary.

That is what we found in 40 per cent of our cases. Add to this another 48 per cent which deviated from the ideal in only one or two minor points, which, while annoying, were not alarming, and you have a picture of 88 per cent of our small series. If that is a satisfactory result for operations on toxic thyroids, fractured skulls, brain abscesses, dissection of glands of the neck, lung abscesses etc., then avertin is a satisfactory drug in such cases, and deserving of a high rank among pre-anæsthetic sedatives.

Our ideal cases do not include abdominal surgery. We have used avertin three times, in gastrectomy, nephrectomy and removal of a ureteral stone. There were no alarming symptoms, but necessary relaxation could be obtained only by methods commonly used with any ordinary sedative. We hope to increase the range of our operations shortly, but we do not expect to obtain full relaxation on the remarkably small percentages of nitrous oxide mentioned. If it were possible to do so, we would judge, from our present experience, that a dangerously high dose had been given. Certainly, we have not had complete relaxation throughout most of our cases, but it gave the surgeon little concern, outside of the abdomen. Eight other cases have been excluded from the ideal list, owing to the presence of moderate degrees of excitement for 2 to 6 hours post-operatively, although in all other respects the course was excellent. In 3 others complete sleep did not ensue, and after 20 minutes, nitrous oxide was started and carried on as in the normal cases. The mild slowing of respirations and fall in blood pressure which occurred in two-thirds of our cases almost always cleared up with the start of operation, and in 72 per cent of all cases, the pressure was maintained throughout the entire operation, at or above the initial reading. Of the remainder, 4

showed a fall of between 20 and 50 points, with acceleration of the heart, apparently independent of the respirations, which remained good. These patients were not so severely shocked as the pressure would lead one to expect, and all remained warm and dry. These are the abnormal findings which led us to classify certain cases as less than ideal. None were serious, and the combined record of results, equal to, or better than, those with any other routine sedative, stands at 88 per cent.

Only 3 results were classed as poor, and all were due to the very definite depression of the respirations and blood pressure associated with avertin. In them the fall in pressure varied from 60 to 120 points; it was not improved by carbon dioxide and oxygen and remained low during the operation, finishing at levels 30 to 80 points below that at the start. All three were breast amputations. All the patients were rational shortly after return to bed, and convalescence was entirely normal. They received only our usual dose of 100 mgrm. or less, but for them it was undoubtedly an overdose. We have not exceeded 100 mgrm. per kilo., and we have no intention of doing so until there is a very much safer guide than mere body weight. Our weights varied from 53 lbs. to 165 lbs., and the ages from 7 to 74. The oldest and heaviest were by no means consistently abnormal. There is some factor besides body weight which influences the course of the drug. Four cases had advanced myocarditis, as proved by electrocardiograms, and two had murmurs; all did well; whereas the poor cases had no abnormal cardiac findings. The ordinary patient in good condition has, in our experience, shown no marked depression from a dose of 100 mgrm.—quite the reverse in 3 cases in which sleep did not follow. We have been unable to adduce any definite fact beyond this—all of our depressed cases showed a recent loss in weight from their specific complaint, usually carcinoma. We believe that enquiry must always be made for recent loss of weight, and the dose reduced to at least 90 or 80 mgrm., depending on the severity of the loss. The reduced dose may be insufficient in its sedative action, but it will probably be safe. The exception to this is in toxic thyroid cases, which show a high tolerance. Five patients had basal rates ranging from 126 to 147; they were among our best results, but showed relatively less avertin effect than 3 with non-toxic thyroids. In 8 cases the question of possible liver damage was investigated by the Van den Bergh reaction, the test being done before operation, and again 2 to 6 days after. There was no significant change, nor was any symptom suggestive of liver damage observed.* This is in keeping with the results in the animal experiments of Wesley Bourne. He found slight immediate damage (no more than with ether) and no late damage whatever. He concluded that the harm done the liver was negligible, thus differing from chloroform, to which avertin is rather closely allied chemically. Practically the same thing was found with the kidney—slight immediate damage which returned to normal in 24 hours. In both cases, pre-existing damage was made temporarily worse, but only slightly, and the extra damage disappeared in 24 to 48 hours. Again our results bore this out, in the only two kidney cases involved, in neither of which, was harm observed.†

We have used nitrous oxide as our routine supplemental anæsthetic. Ether alone was used in 2 cases, and with nitrous oxide in 5 cases. We do not see that avertin has any particular advantage to warrant its use with ether. The amount of ether used is possibly a little smaller than after morphine, but not sufficiently so to make any great difference. The only real advantage would seem to be in avoiding the discomfort of an ether induction in a home or hospital in which gas was not available, and that is scarcely advisable in view of the difficulties which may arise. It certainly does not smooth the path of the amateur, for the ordinary signs of ether anæsthesia are so distorted as to be of little value. The same applies, of course, to the signs with nitrous oxide, but with such high percentages of oxygen there seems little danger of poisoning.

In conclusion, we believe that the greatest

* See also the article entitled "The Use of Avertin in Multiple Dressings, etc.," McKim and Bourne, in this issue, page 149. [ED.]

† In an effort to clear up this very important point, Dr. Lucas has been investigating the excretion of the drug in the urine, and has done a great deal of work on 24-hour specimens from a number of these patients. It is possible that in the light of this work in the Department of Pharmacology we may be forced to reach other conclusions.

value of avertin lies in widening the field in which nitrous oxide and oxygen alone can be used satisfactorily. Where there is real reason for avoiding even an ounce of ether, then avertin would seem to be indicated. Particularly is this the case where the anæsthetist is lacking in the skill which comes only with the years of practice, which many of us have not had. Unquestionably, the highly expert worker can carry most patients on gas alone through the types of operations mentioned, but there are hundreds of men throughout the country giving gas to-day without the experience necessary to make that a safe procedure for the patient. We believe that, where ether is contraindicated, the combination of avertin with nitrous oxide-oxygen presents less danger to the average patient, with the average anæsthetist, than does nitrous oxide plus morphine or other sedative.

MYALGIA OF THE ABDOMINAL WALL*

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A NOT infrequent site of chronic abdominal pain lies in the abdominal wall—a strangely neglected fact to which I wish to direct attention. At the outset one may ask the average physician or surgeon how often, when confronted with obscure abdominal pain, he even thinks of the possibility of its origin in tissues outside the peritoneum. Acute and chronic lumbago is readily conceded to exist; even intercostal neuralgia obtains a grudging recognition, but for some mysterious reason, the muscles, fibrous tissue and nerves of the anterior abdominal wall are not even considered in disease. The integument of the abdominal cavity, in front at least, is, like Cæsar's wife, above suspicion. But let the trusting practitioner suspend his judgment and at least submit the abdominal wall to a simple test before he assumes the intraperitoneal origin of every obscure ache of the abdomen: let him make the abdominal muscles tense and palpate carefully the contracted muscles. He will find, in some cases of obscure pain, highly sensitive points, obviously superficial, to which the patient will unhesitatingly refer his trouble, while deep palpation with relaxed abdominal wall will elicit much less local tenderness.

It is difficult to understand the indifference of the profession to the condition, call it "myalgia" or "neuralgia" as you please. Murray,[1] Llewellyn and Jones[2] in England, Adolf Schmidt[3] and Ortner[4] in Germany, and Carnett[5] in the United States, have emphasized its importance, while Lehmann, of Winnipeg, who first drew my attention to the subject some eight years ago, has long taught its diagnosis and successful treatment. (See also Hunter[6]).

The following remarks are based mainly on an analysis of some 25 cases, but I have seen many more which undoubtedly belong to this group, though my notes are too fragmentary to be of much service.

Etiology.—The condition is found, in my experience, in women fully twice as often as in men, and generally between the ages of 25 to 40. Some few cases may be traced to a sudden strain or trauma and begin acutely, but, as might be inferred from its greater incidence in women, more often the condition develops gradually without obvious cause. The victims are usually of poor physique, often enteroptotic, but there are many exceptions. Previous abdominal operations seem sometimes an exciting cause, as will be noted later, but often the abdominal exploration with removal of the appendix or ovary has evidently been performed for this unrecognized condition. Focal infection has, I think, little etiological significance, and the influence of chilling is only occasionally noted.

Pathology.—There is no known pathological change. Tiny nodules of circumscribed thickenings have been occasionally described in the abdominal muscles, though I have never personally felt them in this position. Stockman,[7] of Glasgow, and others have found inflammatory hyperplasia of the connective tissue when these nodules were examined microscopically. Most observers do not confirm the presence of nodules in myalgia, and even those who do are usually unable to discover any lesion microscopically. Hence the tendency to regard myalgia as either

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a neuralgia of the sensory nerves to the muscle (Schmidt, Carnett), or as a disturbance of the colloid constituents of muscular tissue, (Willy Alexander,[7] Lange[8]).

Symptomatology.—Pain is the outstanding symptom. Usually an aching soreness, it may be a dull, wearing pain, or, occasionally, sharp and toothache-like in character. It is occasionally exactly localized to one point by the patient, but much more often is rather diffuse over a segment of the abdomen; it is generally confined to one side, but may be bilateral, and then not necessarily symmetrical. The right iliac fossa is most frequently involved, though the left does not escape and even the upper abdomen is occasionally implicated. The aching may pass into the corresponding thigh or may be associated with myalgic pains elsewhere, especially in the upper gluteal region. The pain has no definite relation to food or to movement of the bowels, though an indefinite dyspepsia is often present. It is generally relieved by lying down, and may be aggravated by certain movements, *e.g.*, turning over on one side, reaching up to take some object down, coughing, or sneezing. It is at times moderately severe, but not disabling, so that the patient continues at work. It may be present off and on for months or even years, during which its wearing, disturbing character drives the sufferer to seek relief and makes him willing to accept operation should this be suggested. There is usually, I think, no special hyperæsthesia; the skin and subcutaneous tissues can usually be lifted up and squeezed between thumb and forefinger without special discomfort. *Palpation systematically conducted gives the clue.* It will be admitted that, ordinarily, one palpates the abdomen with the abdominal muscles as relaxed as possible, the patient's head and neck being slightly thrown back, his lower extremities somewhat drawn up in an easy position, his breathing natural or somewhat deep, his attention distracted. Such abdominal relaxation lends itself to a better palpation of the abdominal cavity, to the detection of *intra*-abdominal tenderness, but only when very deep pressure is exerted on the yielding muscles is marked sensitiveness elicited when the lesion lies in the abdominal wall, and it is then apt to be referred to some underlying viscus. We are creatures of habit; we have been taught so to palpate. This is the explanation why abdominal myalgia is so frequently missed—we never look for it. If, however, one systematically palpates the abdomen *in all doubtful cases, with the abdominal muscles on guard,* one finds a localized area (or more than one), which is exquisitely sensitive under pressure, and the patient generally becomes aware for the first time that the origin of his somewhat diffuse pain can be strictly localized to one little spot from which it radiates. An exceptional patient realizes from the onset of his trouble that the site of pain is in the abdominal wall, and even tries in vain to interest his medical attendant in this diagnosis, but most sufferers take for granted that the trouble lies inside the abdomen.

The common site of localized sensitiveness is in the outer edge of the rectus muscle from the umbilical level downwards and more often on the right side. When the abdomen is palpated as the patient lies flat on his back with knees drawn up there is no marked tenderness, at least until quite deep pressure compresses sharply even the yielding abdominal muscle; when, however, he gradually raises his head and then his trunk towards the sitting position the recti are called into action, and a markedly sensitive spot is readily demonstrated on systematic palpation of the recti. Sometimes it is easier to demonstrate the existence of localized muscular sensitiveness when the patient holds his legs raised from the bed with the knees extended. The pressure necessary to elicit the tenderness varies sometimes, but it is never excessive. Care must be exercised during the examination that the patient maintain his muscles in active contraction, as he is apt otherwise to relax as soon as pain is elicited, thus evading the test. The sensitive area is extremely localized, usually no bigger than the tip of a lead pencil; the tip of the finger is thus rather large for the very exact localization which is desirable before injection treatment is undertaken.

It is a surprise both to the patient and to the physican to find that a long-standing pain which has been diffusely referred, *e.g.*, to the right iliac fossa, is capable of being so accurately localized to a point on the outer edge of the rectus. Once the ache is localized, the patient can generally appreciate that it is really superficial. When, on the other hand, the abdominal wall is not the site of the pain complained of, as in chronic appendicitis, peptic ulcer, chronic cholecystitis, there is no sensitiveness to pressure when the abdominal wall is contracted, but there is often exquisite local sensitiveness to pressure when the muscles are relaxed. In some cases, the ache may be rather low in the right iliac fossa, the

point of tenderness on pressure being over the outer edge of the rectus, a little distance above its insertion into the pubes. The ovary or tube is then suspected and may even be operated on without success. In three cases, the ache was referred to the gall-bladder area, which naturally gave rise to the diagnosis of cholecystitis, but closer examination showed the exquisitely tender spot lay in each case in the abdominal wall. The possible origin of one case may be noted. A man of thirty complained of pain over the right costal margin, and had been regarded for many months as possibly suffering from chronic cholecystitis. He had had no acute attacks, had no dyspepsia, and the gall-bladder was visualized normally; he worked all day at a desk, and, to get better light, sat for the most part obliquely, with his right costal margin resting against the hard desk. Evidently from pressure, or from muscular strain in the cramped position, a myalgia of the insertion of the obliquus muscle resulted. Local massage, with improved posture at the desk, relieved the condition.

Sometimes the ache is referred to the left side of the abdomen, and, if high up, ulcer is apt to be suspected. The characteristic point of tenderness is present on the outer edge of the left rectus; exceptionally, the pain is referred to the abdominal wall, lateral to the rectus muscle, and is perhaps best located on palpation when the patient lies on the sound side and holds his breath.

There may be associated myalgia of the gluteal region or of the lumbar muscles on the same side, and here I have repeatedly felt tender nodules below the posterior iliac crest, well above and posterior to the great trochanter. The doubtful significance of this finding I have already referred to, but in any case, the presence of myalgia in the gluteal region is corroborative evidence in favour of a similar explanation of the abdominal ache. Carnett often finds evidence of intercostal neuralgia in the corresponding nerves in the chest, a point I have unfortunately not investigated, and, though a surgeon, he describes an *acute* abdominal neuralgia which is often mistaken and operated on for acute appendicitis. I have no personal knowledge of this condition, but a mere physician has only exceptionally opportunity to see any case regarded as possibly acute appendicitis. The surgeon and operating general practitioner might with advantage consult Carnett's[9] article on acute abdominal neuralgia, as this condition evidently simulates acute appendicitis most closely, giving rise to slight temperature, slight leucocytosis, exceptionally vomiting, but not to muscular rigidity.

In abdominal myalgia it is probable enough that the points of sensitiveness on the outer edge of the tensed rectus represent the sites of entry of the sensory nerves to the muscle. In a number of cases seen, operation had been performed with the diagnosis of chronic appendicitis, but without relief. The continuance of the pain is now apt to be regarded as due to adhesions and operation again considered or actually performed. But adhesions have seldom explained satisfactorily these cases, and operation for the relief of hypothetical adhesions has failed conspicuously. It is surprising to find in some cases that all the trouble has been in the abdominal wall, with probably multiple points of marked sensitiveness to pressure. One such patient I saw two years ago with the history of many abdominal operations; he still complained of abdominal pain and had developed into the usual unhappy abdominal neurasthenic we have all learned to dread. To my surprise, the man presented no special evidence of intra-abdominal disease, but, obviously, myalgia in the abdominal wall was present. Dr. Lehmann gave him injections of saline with novocaine and he went home greatly improved.

Dr. Thorlakson has pointed out to me that in some cases of abdominal myalgia, a perfectly justifiable operation has been performed, *e.g.*, for acute appendicitis; the myalgic symptoms have developed *after* the operation and have been difficult to explain. In some such cases the sensitive area lies at the outer edge of the rectus muscle, close to the termination of the abdominal scar, suggesting that a sensory twig to the rectus has been caught in the scar and so has given rise to the myalgic pain.

Diagnosis.—Extreme care should be exercised in making a diagnosis of abdominal myalgia. Most of the cases, however, I have seen had suffered for many months or years, and had been investigated pretty thoroughly, so that gastrointestinal x-rays, gall-bladder visualization, and test meal results were already available. A careful and detailed history is essential, bringing out the negative points of value in the differential diagnosis. There is no definite relationship to food, as in peptic ulcer, no acute attacks with gassy dyspepsia, as in cholecystitis, no relationship of the pain to movement of the bowels or the passage of urine. The gastrointestinal x-ray

examination, gall-bladder visualization, and test meal are normal.

The question of chronic appendicitis will often come up, in view of the frequent reference of myalgic pain to the right iliac fossa. The absence of an acute attack and of the rather characteristic dyspepsia should weight heavily against the diagnosis of chronic appendicitis; right-sided pain alone will seldom justify such a diagnosis. When constipation, enteroptosis, calculus of the right ureter, glands in the right iliac fossa, have been eliminated as far as possible, abdominal myalgia should be considered.

If there be tenderness on palpation over any part of the abdomen, one should try to ascertain if this tenderness be in the abdominal wall or deeper. It is well to remember in palpation of the abdomen that (1) tenderness elicited over relaxed muscles may be either parietal or intra-abdominal in origin; (2) tenderness elicited over relaxed muscles, but absent when the muscles are contracted, is intra-abdominal in origin; (3) tenderness elicited readily on pressure when the abdominal muscles are put on guard, but present with relaxed muscles only on deep pressure or hardly at all, takes its origin in the abdominal wall.

Too often, in my judgment, minor abnormalities in the pelvis are taken seriously and unnecessary operations performed, where the real site of discomfort complained of lies in the outer edge of the rectus low down. The possibility of abdominal myalgia should be particularly remembered where an ache remains after some justifiable operation, or after an abdominal operation has failed to relieve symptoms.

No doubt, a combination of abdominal lesion and myalgia may occur and the relative importance of the two conditions may be hard to estimate. The question of the viscero-sensory and viscero-motor reflexes of Mackenzie and Head comes up here. These observers held that stimulation of the splanchnic nerves in disease gave rise to a heightened sensitiveness in the corresponding pinal segments of the cord to which these afferent nerves stream; the spinal nerves within this irritable focus of the cord are stimulated, the sensory giving rise to hyperalgesia, and the motor to protective muscular contraction in the corresponding segments of the abdominal wall. It might be claimed that such referred pains would explain the sensitiveness to pressure I have just described in myalgia, and also the hyperæsthesia which Carnett generally finds in these cases, but in most of the patients under consideration no intra-abdominal lesion exists to give rise to reflex pain and muscular contraction and, further, there is no tonic muscular contraction or rigidity in abdominal myalgia. Surgeons in general have, I think, paid only lip-service to viscero-sensory and viscero-motor reflexes. Morley,[10] of Manchester, has recently made a powerful plea denying these hypothetical reflexes and explaining more simply the pain experienced in the abdominal wall in visceral disease as derived from stimulation of the corresponding anterior peritoneum adjacent to the viscus involved—that is, from cerebrospinal nerves supplying the anterior peritoneum to their corresponding subcutaneous branches, without the mediation of splanchnic stimulation.

A last objection may be mentioned. Many of these patients are of the nervous build, and their complaints are, as it were, under suspicion. Cannot the abdominal ache be "neurotic" and its relief from injection treatment purely suggestive? A fair number, however, are not in the least neurotic; their only complaint is of the abdominal pain which has been present for months or years. But consistent and prolonged discomfort referred to one segment of the abdomen is always suspicious of local organic lesion, not of neurosis, and this suspicion is confirmed when by a simple injection treatment the symptoms are relieved. The cure of a neurosis, if such it be, by a saline injection is surely sufficiently simple and unobjectionable to appeal to the most sceptical practitioner, who may, if he will, dispute the presence of an underlying myalgia or neuralgia, but need not therefore refuse to secure a cure by the simple method suggested.

Treatment.—The mere reassurance that the ache is in the abdominal wall, that it will lead to nothing serious, and that no operation is required, does sometimes a great deal. We physicians insufficiently recognize the influence of fear and doubt in heightening sensations of discomfort from any part of the body which is under suspicion. The fear of appendicitis is now widespread, and is responsible for closer attention being paid to discomforts arising in the right lower quadrant of the abdomen. In slight cases, aspirin, the application of extract of belladonna, one drachm; ung. iodi one ounce; or repeated massage to the tender area are useful in mild cases. But in any well marked or long-standing case injection treatment is indicated and gives usually satisfactory results if carefully carried

out. Dr. Thorlakson, of the MacLean-Thorlakson Clinic, who is much interested in these cases, has kindly supplied the following details for successful management of this treatment.

"Equipment required: (*a*) A 20 c.c. syringe; (*b*) a 20-gauge needle, 2-2½ inches long; (*c*) novocaine solution ½ per cent, 1-3 ounces; (*d*) iodine 2½ per cent; (*e*) wooden applicators, with a small amount of absorbent.

"Technique of injection: The painful area is localized by finger point pressure (using preferably the middle finger) while the muscle is tense. This area is painted with 2½ per cent iodine and the spot more exactly localized by using a wooden applicator; the point at which the needle is to be inserted can be more accurately ascertained and the direction in which the needle is to be inserted can be also accurately determined. Besides, pressure on the applicator leaves a small mark on the skin through which the needle should be inserted. The care with which these preliminary measures are carried out influences very greatly the success of the injection. The 20 c.c. syringe is filled with ½ per cent novocaine solution and a needle of the desired length is attached. The needle is inserted through the skin, superficial fascia and aponeurosis. The novocaine solution is not introduced until the needle has pierced the layer of the aponeurosis, because I believe the painful area is immediately subjacent to the aponeurosis in the majority of cases. The needle, however, is now carried deeper to the extra-peritoneal layer, the solution being injected as the needle is advanced. If one is not satisfied that the proper area is injected, the needle can be withdrawn to the aponeurosis and reinserted through it at a higher or lower level. The patient will usually experience instant relief when the proper area has been injected. If unsatisfactory, however, the treatment should not be repeated for another week, as a certain amount of bruising and tenderness occurs which is confusing and makes the localization at the second sitting rather difficult.

Using this method, I have been able to follow 21 cases, which may be briefly summarized. They occurred between the ages of 19 and 62 years; 6 males and 15 females. Fourteen occurred in post-operative cases. The number of tender areas varied from 1 to 5. The number of injections varied from 1 to 8. Twelve patients were completely relieved, 5 partly relieved, 4 derived no benefit, and one was not treated."

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FURTHER NOTES ON PITUITARY BASOPHILISM.—In a recent paper Harvey Cushing reported twelve examples of a peculiar and clinically unmistakable polyglandular syndrome. The disorder is characterized by a rapidly acquired plethoric adiposity affecting the face, neck and trunk, the extremities being spared. It is associated in women with hypertrichosis and amenorrhœa. Other characteristic features are vascular hypertension, purplish striæ distensæ of the abdomen, and acrocyanosis with cutis marmorata of the extremities. It is often accompanied by hyperglycæmia, occasionally by polycythæmia, and a peculiar softening of the bones of the skeleton has been commonly found at autopsy. In its extreme forms, the malady has more often been encountered in young adults, and the average duration of life in the fatal cases has been something over five years. It is not an uncommon syndrome. Numerous typical examples have been reported, the disease in most instances having been ascribed to a primary suprarenal disorder for the reason that cortical hyperplasia is a not uncommon postmortem observation. However, in five of the eight cases that had come to autopsy an unsuspected pituitary adenoma was found; and the fact that three of them were unmistakably composed of basophilic elements made it probable, in view of the supposed rarity of adenomas of this type, that the pituitary lesion was the primary [illegible] the syndrome. This at [illegible] the interpretation [illegible] on the matter, the [illegible] matic evidences of disordered function of suprarenal cortex, of pancreatic islets, of parathyroid glandules and of reproductive glands being looked on as wholly secondary expressions of the general endocrine derangement. Since the publication of the preceding paper, new facts have come to hand which seem further to strengthen the views therein expressed. Additional cases serve to increase the percentage of proved basophile adenomas in association with the polyglandular syndrome under discussion. Instead of only three out of eight cases that had been examined post mortem, there are now six out of eleven in which a pituitary basophile adenoma has been disclosed. The pituitary body in two other cases was said to be normal, but in the absence of serial sections this mere statement is no longer convincing. When one takes into consideration that not only the presumed infrequency of adenomas of this type but their small size, whereby they easily escape detection, and couples this with the fact that chief attention has been paid to the condition of the suprarenal glands in all the autopsies heretofore conducted, the fact that a basophile adenoma has been found in half of the patients who have succumbed to this peculiarly unmistakable malady must be something more than coincidence.—*J. Am. M. Ass.*, 1932, 99: 281.

OBSERVATIONS ON THE SIGNIFICANCE OF THE CHOLESTEROL CONTENT OF THE BLOOD PLASMA IN DIABETES MELLITUS*

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IN 1929 the writer[1] reported the results of a statistical investigation of the cholesterol content of the blood plasma in diabetes mellitus. The conclusions drawn were based upon a study of 2,000 observations in 385 cases. Plasma cholesterol was found to afford a reliable index of progress, and its determination was, therefore, regarded as a valuable aid in the management of this disease. Blood and urine sugar data, when used alone, had their limitations. In some cases, on discharge of the patient from the hospital, the diabetes appeared to be under ideal control, in that the blood sugars were normal and the urines were free of sugar with diets compatible with the individual's requirements; the blood plasma, however, contained excess quantities of cholesterol. These patients, as a group, when observed periodically for sometime, did not appear to do as well as those whose bloods contained normal quantities of cholesterol. The incidence of complications (infections, acidosis, neuritis, etc.) appeared to be relatively high and dietary indiscretions or complications resulted in hyperglycæmia not readily controllable with diet or insulin. Amongst those whose bloods contained normal quantities of cholesterol, but at a later date showed excess quantities, there appeared to be a relationship between the degree of control of the diabetes and the cholesterol content of the blood. It was then pointed out that, as with laboratory tests in general, in the interpretation of data, due consideration must be given to other conditions which might also lead to similar results; excess quantities of cholesterol may be found in clinical conditions other than diabetes (jaundice, cholecystitis, pregnancy, nephrosis, etc.). A similar study made in juvenile diabetes[2] led to similar conclusions, and, again, a relationship was found between the concentration of cholesterol in the plasma and the degree of control of the disease. The data fitted with the observation[3] that "increasing tolerance indicating a more or less constantly normal blood sugar usually results in maintenance of the blood fat at the normal level. . . ."

It must be here observed that the conclusions were statistical. They, therefore, may, or may not, and need not necessarily, apply to a given individual. Determination of plasma cholesterol has, however, since been a routine in every case of diabetes in this clinic and many thousands of data have accumulated, and, with additional experiences, there appears to be no reason for modifying the views expressed originally in the above mentioned reports. In the writer's opinion, a normal cholesterol content indicates that the fundamental disturbance of the metabolism of the diabetic is under control. Of course, control and severity are obviously not synonomous terms; severe diabetics are not infrequently seen with normal blood cholesterols; nor does a normal cholesterol imply that a mild diabetic may not meet with complications. It does, however, appear to indicate that, in spite of severity, the disease is under control and the individual is less susceptible to these complications; and as prognosis depends largely upon the latter, a normal cholesterol content indicates a favourable prognosis.

Judging from the literature, Joslin's clinic in Boston is the only other clinic for diabetes in which intensive cholesterol studies similar to our own are made as a routine. Practically simultaneously with our own publication, Hazel Hunt[4] reported the experiences of that clinic. Though the value accepted by Joslin for the upper limit of normality (0.230 per cent) is higher than our own (0.180 per cent) the conclusions drawn were somewhat similar; cholesterol appeared to be a more consistent guide to the real condition of the patient than the blood sugar; and absence of relationship was found between the severity of the diabetes and cholesterol, providing the disease was properly controlled.

Our experiences have also taught us that a person who develops acidosis and coma is

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not necessarily a *permanently severe* diabetic. A mild diabetic may, in spite of normal cholesterol, suddenly lose carbohydrate tolerance, because of an infection, develop acidosis and coma; but with a normal cholesterol, if the infection does not interfere with the action of insulin, that is, if the patient recovers from the coma, the diabetes will probably still be mild. A case met with recently in our clinic may be cited as an example.[5] This man (Hosp. No. 4661/31) was admitted to the hospital with severe acidosis and in early stages of coma. The coma was, apparently, precipitated by infection (cystitis). With insulin he recovered rapidly, was subsequently exposed to a prostatectomy, and discharged from the hospital on a diet compatible with his requirements without the use of insulin. He is still able to do without it: the blood sugars remain normal and the urines are free of sugar. Conversely, with an excess of plasma cholesterol, the diabetic, on recovery from coma, will probably be more severe; the patient will require more insulin and the tendency towards complications will be greater.

HYPERCHOLESTEROLÆMIA AND CAROTINÆMIA

For some as yet unknown reason diabetics tend to retain vegetable pigments more than non-diabetics and this accounts for the high incidence of carotinæmia in this disease. The condition known as *xanthosis diabetica* affords an example of the possible degree of retention of these pigments. The condition is not due entirely to the high vegetable content of the average diabetic diet. For example, of 59 patients with xanthosis diabetica reported by the writer,[6] 13 had never been on special diets prior to detection of this skin condition. Connor[7] also observed that the bloods of many diabetics contained larger quantities of carotin than the normal individual, though they were on practically normal diets. Diabetics with carotinæmia, as those with hypercholesterolæmia, do not appear to do well; large insulin dosage is common and the incidence of arteriosclerosis is high. Thus, of the above mentioned 59 patients with xanthosis, 44—an incidence of approximately 75 per cent—required insulin and 36—an incidence of about 61 per cent—had some evidence of arteriosclerosis; whereas, in the clinic, as a whole, only about 18 per cent were taking insulin and about 22 per cent had arteriosclerosis. The average duration of diabetes amongst the arteriosclerotics with xanthosis was about three years; whereas, amongst the arteriosclerotics in the clinic as a whole it was about five years.

In a statistical study, the writer found a relationship between carotinæmia and hypercholesterolæmia.[8] Such a relationship might, *a priori*, be expected, since plants contain substances (sterols) very closely allied chemically to cholesterol. That this, however, is not the only explanation is suggested from the finding of individuals with marked carotinæmia and no excess of plasma cholesterol and, conversely, individuals with marked hypercholesterolæmia and no undue carotinæmia.

The purpose of referring to the experiences with carotin and cholesterol was to suggest a relationship between these blood constituents and arteriosclerosis. Various explanations have been offered for the high incidence of cardiovascular disease in diabetes, but none has as yet stood the test of experiment. Hypercholesterolæmia has long been suspected, but the mechanism involved still requires elucidation. The writer made a suggestion based upon a study of the colloidal osmotic pressure of the blood in diabetes.[9] Though there was little direct evidence, the sum of all data (clinical and laboratory) then available tended to support the view that, in diabetics with hypercholesterolæmia a colloidal pressure greater than normal is constantly exerted in the capillaries. To overcome the latter, for purposes of renal excretion, a greater hydrostatic pressure is required; this increased pressure, though relatively small, when continued over a long period of time might have the same effect as more marked intracapillary pressure exerted over a short period of time. In animals, the latter, when produced either by injection of epinephrine or by sympathetic stimulation, is alleged to cause arteriosclerosis.

VITAMINES AND ARTERIOSCLEROSIS

An explanation of the high incidence of cardiovascular disease in diabetes may possibly be found in the newer experiences with vitamines, according to the following observations.

Firstly, sterols are practically universally distributed throughout biological media and, though little is known of their functions, some

definite information has been obtained with respect to one of them, namely, ergosterol. The latter is capable of absorbing ultra-violet light rays, and following exposure to these rays is so altered chemically and physically that it acquires physiological and pathological properties; in small doses it may prevent or cure rickets, but, when administered in excessive doses, it readily increases the calcium content of the blood and leads to hypercalcification of the skeletal and other body tissues.

Secondly, there is a very intimate association between cholesterol, sterols in general, and ergosterol; they are almost invariably found together. It, therefore, appears reasonable to assume that blood which contains excess quantities of cholesterol or carotin also contains excess quantities of ergosterol.

Thirdly, in the human being, the epidermal portion of the skin normally contains large amounts of cholesterol and a portion of the skin at least is normally exposed to ultra-violet light. This, as a matter of fact, is supposed to account to some extent for the protection against rickets. Both solar rays and artificial radiation are capable of producing the antirachitic factor. There is still some doubt as to whether all sterols, or certain forms only, possess this antirachitic property. For the present purpose, however, this is irrelevant, since, as stated above, wherever one finds cholesterol one may reasonably assume that ergosterol is also present.

Lastly, there is abundant evidence that the skin of the diabetic is relatively rich in sterols. In addition to chemical evidence (hypercholesterolæmia and carotinæmia), there is clinical evidence, namely, the pigmentations. Diabetic skin must, therefore, also be rich in ergosterol.

Combining these observations, therefore, it appears reasonable that the tissues of the diabetic, because of exposure of the skin to sunlight, are being bombarded continually with irradiated ergosterol and thus are exposed to hypercalcification. The high incidence of arteriosclerosis in the above mentioned group of diabetics with xanthosis is suggestive.

Should this vitamine theory prove to be correct, the outlook of the diabetic appears to be better now than with former methods of treatment; in view of our experiences with the high carbohydrate-low calorie diet.[10 to 13] The most striking metabolic effect of this diet is, as has been shown previously, a rapid and sustained decrease of plasma cholesterol, both in insulin and non-insulin patients, regardless of the type or severity of the disease. The following is a reproduction of the Table showing the experiences with the first five hundred consecutive cholesterol determinations following institution of the new diet.

TABLE I.

CHOLESTEROL CONTENTS OF BLOOD PLASMA FOLLOWING HIGH CARBOHYDRATE-LOW CALORIE DIETS

Plasma cholesterol (per cent)	*First 250 analyses (Incidence)*	*Second 250 analyses (Incidence)*
- 0.100	9	14
0.101 - 0.150	72	104
0.151 - 0.200	118	76
0.201 - 0.250	40	31
0.251 - 0.300	5	14
0.301 +	6	11
Average	0.170	0.163

(Rabinowitch, I. M., *New Eng. J. Med.*, 1931, 16: 799.)

More recent experiences differ in no way from those reported previously.

In the past it was very uncommon to see a diabetic, with the disease of five years' duration, without some evidence of arteriosclerosis, regardless of his age. Five years' experience with the new diet should, therefore, prove or disprove the value of this diet in the prevention of this complication.

The above observations emphasize the value of cholesterol determination in the management of the diabetic. Reference was made previously to a number of factors which must be considered in the interpretation of data. No consideration was, however, given to possible normal variations. All blood constituents made use of clinically (urea, sugar, creatinine, uric acid, etc.) vary more or less widely in the normal person, and cholesterol is no exception. In a recent paper, McEachern and Gilmour [14] record their observations in 28 normal fasting individuals. Blood analyses were made at hourly intervals for five hours. The findings were rather disturbing. Wide variations were noted; the maximum was 84, the minimum was 17, and the average was 41 mgrm. per 100 c.c. It would appear, there-

fore, that such wide variations would tend to minimize the value of this test.*

As stated before, the conclusions drawn from the cholesterol studies were statistical. Contrary to the general tendency in medicine, however, the writer has very much faith in such conclusions, providing proper statistical methods are employed and the results are properly interpreted. It is suggested that the generally prevalent skepticism in medicine is largely due to abuse of statistical methods by those not thoroughly familiar with technique, application or interpretation. Cholesterol studies afford an example of the use to which these methods may be put. Thus, maximum, minimum and average values alone, as given by McEachern and Gilmour, afford little indication of the significance of any series of measurements. Maximum and minimum values merely indicate *possibilities*, and an average, when given alone, that is, without its probable error, is of very little value; it affords no index of *probability*, since a few extreme values, high or low, may affect it very appreciably, especially in a *small* series of measurements. It may, therefore, be observed that the number of observations made by McEachern and Gilmour, compared with our own, was small. Thus:—

TABLE II.

	Number of observations	*Number of subjects*
McEachern and Gilmour..	140	28
Rabinowitch.....	2,000	385

A Frequency Distribution Table affords a better indication of conditions than maximum, minimum and average values alone; it yields information both as to *probabilities* and *possibilities*. As it is not only the total number of observations but the *wide* variations and their number which tend to affect an average in a small series of measurements, the importance of knowing the incidence of such variations is obvious. The writer, therefore, recalculated the data given by McEachern and Gilmour in Table II of their report and constructed such a Frequency Distribution Table, with the following results:—

TABLE III.

Cholesterol range mgrm. per 100 c.c.	*Number of cases*
-40	17
41 - 50	4
51 - 60	4
61 - 70	2
71 - 80	0
81+	1

It will be noted that the occurrence of wide variations was very uncommon; the maximum variation of 84 mgrm. applied to one only of the whole series of twenty-eight patients (Subject T. O.).

In Table IV of the same report are recorded half-hourly variations of plasma cholesterol of normal fasting individuals. These, again, indicate that wide variations were very uncommon; in the eight cases studied, the maximum variation was 46 mgrm. only (Subject B. A.); the minimum was 22 (Subject H. A.) and the average was 31 mgrm. per 100 c.c.

It is of interest here to note that, in spite of the variations found in normal subjects, the highest cholesterol value noted, when blood was obtained in the fasting state, was 0.218 per cent; 8 only of the 178 estimations (Tables II and IV) showed values above 0.200 per cent and the arithmetical mean of all values was 0.161 per cent. The latter agrees very closely with the writer's standard of normality, namely, 0.180 per cent. In other words, in spite of wide variations, the normal subjects showed normal, or nearly normal, values. If we accept Joslin's[15] upper limit of normality, namely, 0.23 per cent, *all* values were within the normal limits of variation. The experiences with cholesterols are, therefore, similar to those with blood sugar. The latter, as is well known, varies widely, ranging between 0.08 and 0.120 per cent; and a normal person, regardless of the variations has always a normal blood sugar when examinations are made in the fasting state.

A glance at any of the records of our diabetics, selected at random, also shows variations;

* Since this paper was submitted for publication, further observations on Variations of Blood Cholesterol were reported by Bruger and Somach (*J. Biol. Chem.*, 1932, 97: 23). These authors found that the cholesterol content of the blood of normal individuals undergoes variations which are of the same magnitude as those found in pathological states. These authors state they were unable to explain the wide variations reported by McEachern and Gilmour; wider variations were found by the latter in 5 hours than observed by Bruger and Somach in 24 hours.

and these, it may be noted, are as a rule wider than those found by McEachern and Gilmour in normal subjects. An important observation, however, is that there is a fairly sharp line of demarcation between the normal and the pathological, providing that the data are obtained under *uniform conditions,* both with regard to technique and preparation of patient. According to our experience with many thousands of analyses, a change from the normal to the pathological or from the pathological to the normal level has invariably been the result of some condition to which the patient was exposed and which is generally recognized as a cause of alteration of carbohydrate tolerance (diet, insulin dosage, exercise, etc.). The following cases are cited as examples:—

TABLE IV.

(Hosp. No. 6286/27)

Date	*Cholesterol (per cent)*
Dec. 2.....	0.289
" 3.....	0.311
" 5.....	0.272
" 7.....	0.305
" 9.....	0.239

It will be observed that, in spite of wide variations, all values were definitely above the normal level.

In 1927, this patient was on a low carbohydrate-high fat diet, consisting of approximately 50 grm. carbohydrate, 150 grm. fat and 50 grm. protein. Though he looked and felt well and the blood sugars at no time showed any marked degree of hyperglycæmia, ranging between 0.137 and 0.181 per cent (a normal value was found on one occasion only) the plasma cholesterol reached and remained at a high level in spite of the wide variations. The following shows the records obtained in 1928:—

TABLE V.

Date	*Sugar (per cent)*	*Cholesterol (per cent)*
Jan. 17.....	0.143	0.537
Mar. 29.....	0.158	0.383
May 8.....	0.161	0.606
Sept. 10.....	0.181	0.505
Nov. 5.....	0.119	0.476

Until June 4, 1929, there were no further data. On that day, the blood sugar was 0.143 per cent, and the plasma cholesterol was still very high, namely, 0.582 per cent. The carbohydrate content of the diet was then increased to 75 grm. The results of the examination following this change of diet were as follows:—

TABLE VI.

Date	*Sugar (per cent)*	*Cholesterol (per cent)*
Sept. 16/29.....	0.188	0.416
Mar. 7/30.....	0.181	0.520
Oct. 14/30.....	0.156	0.333
June 6/31.....	0.181	0.370

It will be noted that there was a tendency towards a decrease of cholesterol. The carbohydrate content of the diet was then further increased to 100 grm. and, on November 2, 1931, the blood sugar was 0.151 per cent and the cholesterol was definitely lower, namely, 0.302 per cent. The diet was then changed to the new high carbohydrate-low calorie diet and consisted of 218 grm. carbohydrate, 45 grm. fat and 69 grm. protein. With this change of treatment, the cholesterol approached the normal level. Thus:—

TABLE VII.

Date	*Sugar (per cent)*	*Cholesterol (per cent)*
Dec. 5/31.....	0.166	0.268
Jan. 9/32.....	0.140	0.238

That the above results were not accidental is shown by the following case.

CASE 1

A. A. B. is a moderately advanced diabetic, but is able to maintain his height-weight relationship and keep his urine free of sugar and the blood sugar nearly normal without the use of insulin. When he was first seen (October 4, 1928), the blood sugar was normal, namely, 0.105 per cent, and the plasma cholesterol was 0.219 per cent. His diet then consisted of approximately 75 grm. carbohydrate, 175 grm. fat and 50 grm. protein. On January 10, 1929, the blood sugar was 0.137 per cent and the cholesterol was 0.333 per cent. Because of the increase of cholesterol, the diet was changed to 100 grm. carbohydrate. In spite of this change, the cholesterol remained at a high level. Thus:—

TABLE VIII.

Date	*Blood* *Sugar (per cent)*	*Blood* *Cholesterol (per cent)*
May 16/29.....	0.192	0.416
Nov. 8/29.....	0.169	0.416
Feb. 21/30.....	0.126	0.302
July 10/30.....	0.133	0.302
Dec. 2/30.....	0.188	0.321
April 16/31.....	0.200	0.333

On April 16, 1931, the diet was changed to the high carbohydrate-low fat, namely, 254 grm. carbohydrate, 45 grm. fat and 75 grm. protein. On June 21st, the blood sugar was 0.143 per cent and the cholesterol decreased to 0.208 per cent! On this day, the diet was further increased to 272 grm. carbohydrate, 35 grm. fat and 78 grm. protein. At his last examination on July 24th, the blood sugar was normal, namely, 0.116 per cent and the cholesterol was 0.216 per cent.

During the entire period of observation, the urines have always been free of sugar. It will, therefore, be noted that at the time the diabetes was discovered the cholesterol was nearly normal; with the institution of treatment with a high fat and relatively low carbohydrate diet, the cholesterol gradually increased, though the urines were always free of sugar and the bloods showed no marked hyperglycaemia. With the institution of the high carbohydrate-low fat diet, the cholesterol approached the normal level. Incidentally, we have here another demonstration of the effects of the new diet without insulin in a diabetic who follows treatment carefully.

The following case shows the results of plasma cholesterol determinations made approximately monthly during a period of more than three years and, in spite of the fluctuations, these clearly indicate the course of events.

CASE 2

A male, aged 23 years, (No. 5053/28), was first admitted to our clinic on August 25, 1928. At that time, his diet consisted of approximately 150 grm. carbohydrate, 150 grm. fat and 60 grm. protein, and in order to keep the urine free of sugar and the blood sugar normal or nearly so he required 20 units of insulin twice a day, one-half hour before breakfast and one-half hour before the evening meal. In spite of the apparently good control of the diabetes, according to blood and urinary sugar data, the plasma cholesterol gradually increased; in August, 1928, it was 0.236 and on April 15, 1929, it was 0.396 per cent. Following increase of insulin dosage the cholesterol decreased, though it did not reach the normal level, according to the writer's standard; on October 28th, it was 0.216 per cent. In December of the same year, it again increased. On March 7, 1930, the diet was changed to the high carbohydrate-low fat consisting of 218 grm. carbohydrate, 56 grm. fat and 69 grm. protein. On June 11th, the diet was further increased to 236 grm. carbohydrate and on July 2nd to 254 grm. carbohydrate.

In spite of the variations, it will be noted here that, following institution of the high carbohydrate-low calorie diet, the blood cholesterol decreased to the normal level and has since been normal, except at one examination (April 2, 1931). Thus:—

TABLE IX.

(Hosp. No. 5053/28)

Date	*Plasma cholesterol (per cent)*	*Diet C.*	*F.*	*P.*	*Insulin (units)*
Aug. 25 28	0 236	150	150	60	20/0/20
Oct. 26 28	0 241	"	"	"	"
Nov. 16 28	0.260	"	"	"	"
Dec. 15 28	0 282	"	"	"	"
Jan. 11 29	0 340	"	"	"	"
Feb. 8 29	0 315	"	"	"	"
Mar. 8 29	0 273	"	"	"	"
Apr. 5 29	0 396	"	"	"	20/10/20
May 29 29	0 232	"	"	"	"
June 27 29	0.285	"	"	"	"
July 30 29	0 254	"	"	"	"
Aug 27 29	0 242	"	"	"	"
Oct. 28 29	0 216	"	"	"	"
Dec. 26 29	0 321	"	"	"	"
Jan. 16 30	0 277	"	"	"	"
Mar. 7 30	0 252	218	56	69	"
June 11 30	0 120	236	"	72	"
July 2 30	0 145	254	"	"	20/0/20
Sept. 1 30	0 139	"	"	"	"
Oct. 2 30	0 111	"	"	"	"
Nov. 7 30	0.111	"	"	"	"
Dec. 30 30	0 160	"	"	"	"
Feb. 5 31	0 117	"	"	"	"
Apr. 2 31	0.241	"	"	"	"
May 11 31	0 166	"	"	"	"
July 7 31	0 184	"	"	"	"
Aug. 6 31	0 125	"	"	"	"
Sept. 15 31	0 122	"	"	"	"
Oct. 24 31	0 166	"	"	"	"
Nov. 17 31	0.166	"	"	"	"
Jan. 13 32	0.156	"	"	"	"

The bloods of persons in whom the diabetes is under ideal control show persistently normal values, in spite of wide variations. The following case is cited as an example.

CASE 3

(No. 6228/30) a male, aged 16 years. Data were obtained at approximately monthly intervals:

TABLE X.

(Hosp. No. 6228/30)

Date	*Cholesterol (per cent)*
Sept. 19/31	0.161
Oct. 24/31	0.164
Nov. 21/31	0.117
Dec. 12/31	0.151
Jan. 9/32	0.157

PLASMA CHOLESTEROL IN INSULIN WASTERS

Cholesterol determinations appear to be of value especially, in estimation of progress of insulin wasters—persons in whom insulin, when administered subcutaneously, acts as though given intravenously; the blood sugars decrease rapidly, but, with equal rapidity, return to the originally high level. Such persons

may suffer severe hypoglycæmic reactions shortly after an evening dosage of insulin, but, in spite of such reactions, have marked hyperglycæmia the following morning. Ideally, such diabetics should be given insulin in small doses at frequent intervals rather than in relationship to meals; and, wherever it is possible, this is the practice in this clinic; the insulin is given every 6 or 8 hours. We have about 20 such cases. In some the plasma cholesterol is normal, while in others, it is increased; and it is of interest to note that those with normal cholesterols appear to do well, in spite of persistent and marked hyperglycæmia and glycosuria. Some of these patients have been observed for years. In spite of glycosuria and fasting blood sugars ranging between 0.2 and 0.6 per cent, they feel well, perform their ordinary duties, maintain their expected body weights, and are, apparently, not unduly subject to complications. It would obviously be a fallacy to judge the severity of the diabetes in these cases by the difficulty with which hyperglycæmia and glycosuria are controlled. The following case is cited as an example:—

CASE 4

(Hosp. No. 3964/26) female, aged 61; duration of disease, 5 years. This patient is superintendent of a very active hospital, does not tire unduly, and on two occasions only has been off duty for a few days because of mild illness (respiratory and tooth infection). The following are the results of examinations made at different intervals during the last two years:—

TABLE XI.

Date	*Blood sugar (per cent)*	*Cholesterol (per cent)*
Jan. 9/30.....	0.454	0.157
Feb. 19/30.....	0.357	0.159
July 2/30.....	0.400	0.181
Sept. 11/30.....	0.384	0.249
Dec. 19/30.....	0.400	0.216
May 16/31.....	0.454	0.277
July 25/31.....	0.370	0.216
Nov. 9/31.....	0.344	0.208
Feb. 20/32.....	0.500	0.204

It will be noted that, in spite of the persistently marked hyperglycæmia, the plasma cholesterol was normal or only moderately increased.

Age might be considered a contributing factor; in diabetics at 60 the diabetes tends to be milder than at younger ages. The following case is, therefore, cited as another example:—

CASE 5

(Hosp. No. 6550/29) female, aged 25; duration of diabetes three years; a school teacher actively on duty. Hyperglycæmia and glycosuria have apparently had no effect on her general health. Here, again, with very few exceptions, we note normal or nearly normal plasma cholesterol values. Thus:—

TABLE XII.

Date	*Blood sugar (per cent)*	*Cholesterol (per cent)*
Nov. 1/30.....	0.500	0.196
Dec. 6/30.....	0.370	0.256
Jan. 24/31.....	0.476	0.192
Mar. 7/31.....	0.625	0.181
Apr. 25/31.....	0.416	0.200
May 30/31.....	0.500	0.287
Sept. 12/31.....	0.500	0.268
Nov. 28/31.....	0.370	0.222
Dec. 19/31.....	0.370	0.179
Mar. 12/32.....	0.416	0.160

Citation of more cases would be merely repetition of data. The purpose of this communication is to again emphasize the value of determination of plasma cholesterols in the estimation of progress and prognosis of the diabetic. Though wide variations may be noted in the diabetic, as in a normal person, the fluctuation of values does not minimize the value of the test. Repeated experiences have shown that there is a fairly sharp line of demarcation between the normal and the diabetic. Wide as the fluctuations may be in the normal, the values reported by McEachern and Gilmour clearly indicate that all values, including the maximum noted, were still below that generally regarded as definitely pathological; and, diabetics exceed this level only when the disease is not under control.

Attention is drawn to the marked hyperglycæmia and glycosuria met with in insulin-wasters, and which appear, at least up to the present time to have been compatible with good health, providing that the plasma cholesterol was either normal or only slightly increased.

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FUNCTIONAL ALBUMINURIA*

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THE finding of albumin in the urine is something which, since the days of Bright, calls the clinician's attention to the possibility of organic disease in the kidney. The old axiom that "albuminuria is a sign of Bright's disease until proved otherwise," has perhaps served a useful purpose in prompting the physician to investigate such a finding with a view to ruling out or proving the presence of nephritis. We can, however, appreciate the fallacy of this axiom when we realize that albuminuria is such a common finding in the absence of renal disease, and, further, that Bright's disease may run its course to a fatal issue without albuminuria.

The presence of albumin in the urine was first demonstrated by Cotugno in the 18th century. He believed it to be due to an abnormal condition of the blood. Even after Bright's[1] demonstration in 1827 of the connection between albuminuria, dropsy and renal disease, this view was widely held. Gull was the first to suggest that albuminuria might be attributed in some instances to changes of posture without any evidence of kidney lesion. Moxon[2] described an albuminuria of adolescents associated with oxaluria which Pavy described as "cyclic albuminuria." Duke[3] found that 14 to 16 per cent of boys at Rugby School of the ages of 13 to 14 years showed albuminuria. He made follow-up studies on a number of these and found that in most cases the albumin disappeared when adult life was reached. MacLean[4] reported the finding of albumin in the urine of 5.62 per cent of healthy young soldiers. Repeated observation on a number of these showed no greater tendency to develop Bright's disease than in normal individuals. Diehl and McKinlay[5] report an incidence of 5.32 per cent of albuminuria in the examination of 20,000 male students at the University of Minnesota. Re-examination of a number of these students showed persistent albuminuria in only 11.8 per cent, the majority of whom showed evidence of probable kidney disease.

Most writers agree that albuminuria may exist in the absence of organic disease of the kidney or any tendency thereto. If this is so, why does the condition occur and what are the possible contributing factors? Certain types of diet have been held responsible. Emotional causes have been given an important place. A predisposition to albuminuria occurs in adolescence, and, according to Moxon, these individuals are "anæmic, listless and languid." Exercise and posture have been shown to produce albuminuria. The mechanical factor seems to be the essential one in the condition for the following reason. Many persons with albuminuria have lordosis, and when this is temporarily corrected by leaning or kneeling forward they are albumin-free, whereas if they kneel, leaning backward, it reappears. This is evidence that postural change is one cause of the condition. The presence of lordosis is not always evident in functional albuminuria. There is a very definite type of individual other than the lordotic who is prone to albuminuria called the longitudinal type. The characteristics of this type of physical make-up are a small upper and long lower body. The diaphragm in such persons is very high on lying down and low on standing, and Jehle[6] suggests that the albuminuria is due to venous stasis resulting from kinking of the left renal vein, or pinching of the vein between the aorta and superior mesenteric artery or by the diaphragm itself.

Sonne has pointed out that functional albuminuria is usually unilateral. He examined six cases by ureteral catheter while the patient was in a lordotic position and showed that the urine from the left kidney contained albumin while that from the right was albumin-free. This he explains by pointing out that the left renal vein in its course to join the inferior vena cava passes over the aorta and vertebral column and is compressed in lordotic postures

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leading to venous stasis in the left kidney with resultant albuminuria.

Jehle[6] has devised a simple postural test that can be readily carried out in the physician's office. His results lend support to his theory previously referred to. This test is carried out as follows. The patient empties the bladder completely and drinks 200 c.c. of water. He is immediately placed in a horizontal kyphotic position on a bed or couch for a period of 30 minutes. This position is attained by having the patient lie with the knees drawn up and the shoulders supported, so that the maximum kyphotic curve must be in the region of the kidneys. The use of a Gatch frame facilitates matters. At the end of 30 minutes the bladder is completely emptied. The patient at once assumes the vertical kyphotic position. To do this he places the left foot on a chair with his left elbow on his knee, resting his chin on his hand. This vertical position is maintained for 15 minutes. At the end of this time the bladder is again completely emptied. The third position is one of vertical lordosis in which the patient stands with his back to the back of a chair. The hands are placed on the back of the chair and the whole trunk is arched forward in a position of extreme lordosis. Care must be taken here that the spine is in definite lordotic posture and that the patient is not merely leaning backwards. This position is held for ten minutes, at the end of which time the bladder is emptied completely.

The four specimens of urine collected are examined for albumin. The usual findings in a case of orthostatic albuminuria are:

First specimen	Albumin present.
Second specimen (After horizontal kyphosis)	Albumin absent.
Third specimen (After vertical kyphosis)	Albumin absent.
Fourth specimen (After vertical lordosis)	Albumin present.

In view of the fact that a considerable number of persons showing the presence of albumin in the urine have been refused life insurance or rejected by aviation boards, etc., and some have even been told they had Bright's disease without further investigation, it was felt by the authors that the use of the above test described by Jehle was not commonly known to the physician in this country. We have undertaken, therefore, to demonstrate its value in the case of albuminuria in young adults. Thirty young men and women, mostly university students, varying in age from sixteen to twenty-five years, were investigated. Each member of this group had shown albuminuria, on a routine examination, on one or more occasions. In no case had there been any history or symptoms of Bright's disease. Examination of the heart and blood pressure showed normal findings.

Certain workers hold that persons showing albuminuria in the absence of other signs of Bright's disease more commonly give a history of previous infections than normal individuals. In view of this fact we have compared the incidence of infections which are ordinarily thought to be causative factors in producing renal disease with that of a control group of 200 healthy students without albuminuria.

TABLE I

	Repeated attacks of tonsillitis	*Acute rheumatism*	*Scarlet fever*	*Influenza*
	per cent	*per cent*	*per cent*	*per cent*
Control group of 200 healthy students without albuminuria	3.5	2.5	17.5	20.0
Thirty persons showing albuminuria	3.0	6.0	18.0	15.0

A study of this Table shows that such infections are no more common in the albuminuric group than in the control.

Since the constitution or physical make-up of the individual determines to some extent the relative position of his viscera and the likelihood of pressure on the venous return from the kidney, we have paid some attention to this characteristic in the group studied. Jehle[6] has pointed out that since the subject with a disproportionately long trunk is endowed with an abnormally low diaphragm, there is a possibility of pressure on the inferior vena cava. We have adopted the ratio between the sitting and standing height as an indication of this tendency. This ratio, termed the sitting-height index, will increase as the length of the trunk increases, relative to the total height. The average sitting-height index in the males showing albuminuria was 0.503 as compared with

These animals, owing to the fact that their alkali increased, became adjusted to the increased tension of CO_2 and breathed normally. When, however, they were again placed in normal atmosphere with a CO_2 tension of 0.03 per cent they showed a prolonged period of apnœa which at times resulted in death from anoxæmia. From these facts one can easily see how important it is to make sure of adequate ventilation and expansion of the lungs before such a phenomenon may take place.

A second phenomenon which may occur following hyperventilation with ordinary atmospheric air, is known as the "Bohr phenomenon".[9] In spontaneous hyperpnœa, and in artificial respiration when unaerated channels still persist in the lung because of bronchial obstruction, increase in anoxæmia and decompensation of the respiratory centre may occur, although cyanosis decreases or disappears. Bohr[9] has shown that hyperventilation will wash out CO_2 more efficiently than it will increase the oxygen-saturation of the hæmoglobin. The first reason for this is that CO_2 is thirty-two times more diffusible than oxygen, so that it will diffuse into the alveolar air and wash out very rapidly. It is not the same with oxygen. When oxygen is present in the alveolar air, under a normal pressure of 90 mm., the hæmoglobin is almost completely transferred into oxyhæmoglobin. Consequently, even a considerable increase in oxygen tension in the alveolar air will have almost no effect on the saturation of the hæmoglobin, so that this addition of oxygen in the alveolar air cannot modify greatly the average oxygen saturation of the hæmoglobin of the mixed blood which is polluted by the non-arterialized blood flowing through the non-aerated pulmonary channels. On the other hand, this hyperventilation will have a disastrous effect because of lowering of the CO_2 pressure. Under ordinary conditions of ventilation with an oxygen pressure of 35 mm. (4.6 per cent) in the alveolar air and a normal pressure of CO_2 (5 per cent – 40 mm.), only 50 per cent of the hæmoglobin will be changed into oxyhæmoglobin, so that marked cyanosis will be present. But the amount of oxygen remaining the same in the alveolar air, if the CO_2 is washed out so that the pressure falls to 0.5 per cent (5 mm.), the hæmoglobin will be 82 per cent saturated, so that cyanosis will disappear. But oxyhæmoglobin under a low CO_2 content holds fast to the oxygen so that it does not give it up easily to the tissues, and in this way, although cyanosis decreases, giving the false impression of a better oxygenation, anoxæmia really increases and the life of the patient is threatened more than ever. From this phenomenon one can see the extreme importance of maintaining the CO_2 tension in the alveolar air and blood stream during any method of resuscitation.

The final point which is necessary to consider in the problem of resuscitation, is what is known as the "Hering-Breuer reflex".[10] The vagi nerves contain two kinds of afferent fibres going to the lungs, or at least fibres with two functions. It would seem that distension of the lungs stimulates the nerve-endings of the vagi in the lungs in such a way as to terminate inspiration and initiate expiration, while deflation of the lungs produces a corresponding stimulus acting so as to terminate expiration and initiate inspiration. Thus inspiration seems to be the cause of expiration, and expiration the cause of inspiration. What is of great importance, regarding this reflex from the standpoint of infant resuscitation, is that it is much more active when the lungs are rhythmically inflated by a tube which has been passed into the trachea.

Let us now consider the methods of resuscitation available for the baby who does not breathe spontaneously and needs some assistance to accommodate itself to extrauterine life. Leaving aside the old methods, we are familiar with three methods which may be used.

1. Mechanical prolonged passive artificial respiration by means of a Drinker apparatus.[11]

2. Inhalation under slight positive pressure of suitable mixtures of oxygen and CO_2 with an ordinary anæsthetic mask, as proposed by Henderson and Haggard.[14]

3. Intratracheal suction and insufflation of suitable oxygen-CO_2 mixtures under suitable pressure, as proposed by Flagg.[13]

Considering the Drinker apparatus, it would seem to be the least desirable of the three. The cost of the apparatus, in the first place, places it beyond the reach of many hospitals. In the second place, if an asphyxiated child can be resuscitated at all, it requires only a short period of artificial respiration without the delay involved in adjusting an elaborate device. This method also neglects the two fundamentals necessary for successful resuscitation, the

anatomical one, which is the patency of the respiratory passages, and, more especially, the physiological one, which is the absolute necessity of the presence of CO_2 in high concentrations in the respiratory air given to the new-born.

Henderson and Haggard's method of resuscitation, by a specially constructed mask which surrounds the infant's entire face, is of undoubted value and is extremely useful in some degrees of asphyxia. Its chief disadvantage lies in the fact that it cannot insure patency of the air way.

Flagg's method of pharyngeal and intratracheal suction, followed by intratracheal insufflation of suitable oxygen-CO_2 mixtures, is undoubtedly the most valuable in severe cases of asphyxia. As well as introducing the mixture beyond any possibility of obstruction it also stimulates the powerful Hering-Breuer reflex, which has so much to do with the continuance of respiration.

In order to be able to treat the asphyxiated baby intelligently, it is as important to grasp the actual degree of asphyxia as to make a diagnosis on a surgical abdomen. The immediate question to be asked and answered is: Into what class of asphyxia does this baby fall? Is he merely depressed, is he clearly a border-line case, or is he dying?

Let us then divide the degrees of asphyxia into three types.

1. The depressed child, who breathes occasionally in gasps, who resists movements of head and extremities, and usually responds to any form of stimulation. This type usually responds to the spanking-tubbing technique. He will promptly and vigorously respond to inhalations of oxygen-Co_2 mixtures administered by a face mask. Such babies, so stimulated, promptly reach a stage of crying and struggling which overcomes their atelectasis through automatic intratracheal pressure against the closed glottis.

2. The asphyxiated baby, whose respiration occurs at long intervals and only following external stimulation, whose muscles are relaxed, who offers no resistance to the opening of the mouth, should immediately be laryngoscoped and the pharynx aspirated. If no reflex irritation is induced by this aspiration, the glottis should be intubated under direct vision, and the trachea aspirated. The reflex tone of the glottis is the best indication of the child's viability.

3. If there is no reflex spasm of the glottis, the baby falls into the third class of asphyxia. He is dying. Such a baby demands immediate and full oxygenation and the stimulating effects of CO_2. As we observe such an infant and observe the lividity or pallor of the skin, the total absence of respiration, the flicker of a heart impulse through the chest-wall, the complete loss of muscle tone, it is easy to understand the necessity for prompt and vigorous action. Through a tube into the trachea oxygen-CO_2 mixtures must be delivered under measured pressure. Such pressure overcomes atelectasis, allows an immediate diffusion of the oxygen-CO_2 mixture, which relieves the right-heart pressure, increases the left-heart circulation, and throws the necessary stimulation into the depressed respiratory centre.

In conclusion, I believe that the treatment of post-natal asphyxia implies first of all recognition of the degree of asphyxia, aspiration, laryngoscopy, intratracheal suction, intratracheal insufflation of suitable oxygen-CO_2 mixtures under measured pressure, with the continuance of insufflation until respiration is re-established or until the circulation is proved to have failed, as evidenced by the persistence of cyanosis in the presence of high percentages of oxygen and CO_2 in the alveolar air. I also believe that this department of obstetrics should be looked after by those engaged in the specialty of anæsthesia. It seems to me that with their knowledge of intratracheal intubation and insufflation, and their constant use of various gases, they are eminently qualified to be of immeasurable assistance to the obstetrician in cases of failure of respiration in the new-born.

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2. Dilatation of the ureters and renal pelvis with stasis is an extremely frequent finding.

3. Treatment by medical means—rest in bed; forced fluids and alkalies is successful in the majority of cases.

4. Should these measures fail to give prompt relief, ureteral catheterization with renal pelvic lavage and the indwelling ureteral catheter should be undertaken immediately.

5. If such measures are promptly and skilfully applied, termination of pregnancy should be rarely necessary.

6. Prophylactic measures should be employed.

7. A plea is made for more careful post-partum observation and treatment.

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THE RESUSCITATION OF THE NEW-BORN*

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IN the higher organisms, as Paul Bert first pointed out, the immediate cause of death of the body as a whole is practically always want of oxygen, owing to the failure of the circulation or breathing. This fact arises from the circumstance that the body has hardly any internal storage capacity for oxygen, but depends from moment to moment for its supply from the air. We can deprive the body for long periods of its external supplies of food, and we can prevent for some time the secretion of urinary products, or even of carbon dioxide, but we cannot interfere with the supply of oxygen without producing at once the most threatening and alarming symptoms.

In the fetus and the new-born before the first breath is drawn the lung is airless, the alveoli are collapsed, the parenchyma is fleshy in consistence, dark in colour and sinks in water. This is the condition designated by the terms "fetal lung" or "atelectasis," which is often reproduced in the adult when bronchial obstruction causes the alveolar air to be absorbed by the blood of the alveolar capillaries.[1, 2] It is, therefore, obvious that the persistence of atelectasis in the new-born will be followed by the most severe respiratory and circulatory disturbances. In a recent thorough statistical study, Yandell Henderson[3] arrived at the conclusion that the combined still-born and new-born deaths due to respiratory complications amount in the United States to over 4 per 100. Although there is no doubt that very many of these could not be prevented, nevertheless we must face the fact that, owing to lack of knowledge or equipment, many infants who might otherwise be saved are not. Whereas almost every branch of medicine and surgery has made enormous advances in the past twenty years, we must admit that exactly the same methods of endeavouring to stimulate a new-born child's respiration are being used in our hospitals today as were twenty or more years ago—a rather inefficient suction apparatus, the warm and cold baths, and the post-natal spanking. If these time-honoured methods fail, there is little more to be done. For the vast majority of cases, I grant you this is all that is required, but for the few in which real trouble is present they seem, at times, very futile. Asphyxia in the new-born is not a simple affair, but is a complicated phenomenon due to anatomical deficiency of the lungs, defective gas exchanges, and a respiratory centre which is not receiving the necessary stimulation.

Let us first consider as a cause of infant mortality inadequate expansion of the lungs and pneumonia developing from atelectasis. In all probability the most important work in this regard has been done by Cruickshank,[4] of London, England. He has found that 68 per cent of infants dying a neonatal death died as a result of asphyxia neonatorum. It has been

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shown that the lung does not undergo full expansion at the first breath. This is attributed to the incomplete development of the nervous system and to the fact that, as infants move very little, the stimulation of the respiratory centre is not particularly evident. The treatment of atelectasis must be directed toward expanding the lungs. For this purpose cutaneous stimulation, to cause the child to cry, is recommended in all ordinary cases, while for the new-born baby who does not breathe all modern methods of stimulation and respiratory aids should be used. Why does a normal new-born baby draw its first breath? In all probability from two causes—the cutaneous reflex caused by coming into contact with the cool air, and the stimulus merely of the CO_2 supplied by the child's own metabolism. Observations on non-breathing infants show that under prolonged asphyxia the respiratory centre undergoes a loss of sensitivity similar to that found under morphine. The centre then requires a stronger chemical stimulation than the body can supply. It responds in quite normal fashion, not to the normal pressure of 5.5 per cent CO_2 but only to 7, 10, 15 or even 20 per cent, according to the degree of depression caused by the asphyxia. It can, therefore, be logically asserted that in the normal child breathing is induced under the stimulation of its own CO_2, and that a partially asphyxiated new-born child is not stimulated to breathe when it is swung, chilled or spanked, but only when the chemical stimulus to its respiratory centre becomes sufficiently strong to induce activity.

The first respiratory movements immediately after birth produce important anatomical and physiological changes in the lung. The lung will dilate little by little, one very important reason for a lack of vigorous activity being the weakness of the muscles of the chest wall, owing to their not having been used heretofore. This increase in size, however, is not accomplished as in a balloon; the lung opens like a lady's fan, according to the expression of Arthur Keith. The capacity of the lungs during the first few hours does not exceed 30 to 50 c.c.,[5, 6] and often it takes several days before expansion is complete. The atelectatic state tends to persist, owing to the fact that a resistance has to be overcome, represented by the cohesion and capillary tension of the alveolar walls which are in contact in the fetal lung. Coryllos and Birnbaum found that a positive pressure equal to 14 cm. of water is necessary to inflate the atelectatic lungs of a dog. This point is of extreme importance in infant resuscitation. It shows clearly that inflation of the lungs in the new-born is rather a slow procedure and also the ease with which bronchial obstruction can oppose the relief of atelectasis. The expansion of the alveoli has an immediate result—the opening up of the perialveolar capillaries, tributaries of the pulmonary artery. This opening of the capillaries develops at the same time with the inflation of the alveoli and, in fact, depends on it. The immediate result of the opening of the alveolar capillaries is that the blood of the pulmonary artery flows toward the lungs, where resistance is considerably smaller than in the left heart and aorta. The foramen ovale gradually closes as the blood no longer impinges against the Eustachian valve as it does during intrauterine life. In this way blood is directed toward the lung and pulmonary circulation is established. From these facts it becomes obvious that persistence of atelectasis in the new-born will be followed by the most severe respiratory and circulatory disturbances If atelectasis is very extensive and not properly relieved death will follow because of asphyxia. If it is only partial, and represented by atelectatic areas distributed throughout the otherwise well-aerated lungs, it may be the origin of infective complications, such as pneumonia or bronchopneumonia, which cause such a tremendous mortality in the new-born, and especially in those which have presented respiratory troubles at birth.

The immediate results of resistance to the respiration will be a decrease in oxygen and increase in CO_2 tension; the alkali of the blood will increase, and at the same time the respiratory centre will be stimulated, causing hyperpnœa which will tend to wash out excess of CO_2. But if because of the resistance, hyperventilation is not able to produce adequate decrease in the presence of CO_2, the ensuing acidosis may be compensated by increase in total CO_2 in the blood as carbonates. The prolongation of this condition will produce in the new-born results very similar to those observed by Henderson and Haggard[7] in dogs which had been kept for considerable periods in an atmosphere with increased CO_2 tension.

Several explanations have been given of the occurrence of this presumably physiological dilatation of the ureter. Pressure of the gravid uterus is most frequently suggested. Though pressure from the gravid uterus might well be considered as a factor later in pregnancy, it has been noted that the dilatation occurs early during pregnancy, reaching its greatest development during the 6th month. Hyperplastic changes in the lower ureter and trigone of the bladder are also considered by some authors as having a direct bearing on the development of dilatation. Seng draws attention to the marked increase in vascularity of the uterus and adnexa which occurs early in pregnancy, and which may well produce pressure changes in the portion of the ureter passing through this area. In many ways this seems to offer the most probable explanation of the dilatation and stasis so commonly noted.

Gastro-intestinal disturbances. — Kretschmer, in 200 cases of pyelitis, found a history of gastro-intestinal disturbance in 30 per cent, constipation being the most common of these conditions. Middleton[10] found colonic stasis in 20 per cent of his cases, while Le Lorier[9] has also drawn attention to the frequency with which atony of the bowel occurs during pregnancy. As a result of intestinal stasis an increased production of colon bacilli occurs. These organisms eventually reach the kidney. It is not my intention to discuss the route by which this renal infection takes place, other than to draw attention to the three possible avenues; namely, by the blood stream, by the lymphatics, and, as an ascending infection, from the lower urinary tract. In the majority of renal infections we have come to look upon hæmatogenous infection as the most common occurrence.

Previous pyelitis.—An additional etiological factor to be considered is the presence of latent infection in the urinary tract. Some authors believe that many cases of pyelitis noted during pregnancy are in reality exacerbations of a pyelitis of infancy which has remained dormant during the intervening years. I have never been able to trace such a connection, but have in my notes records of patients who have given a definite history of bladder trouble prior to pregnancy. However, I do not believe that these cases form a very large group.

INCIDENCE

Pyelitis as a complication of pregnancy occurs more frequently than most of us suspect. Mild cases are often passed over as influenzal attacks and others are missed entirely. Mussey has said that some degree of pyelitis occurs in 20 per cent of all pregnant women. DeLee[5] found evidence that two-thirds of all women dying during pregnancy had had pyelitis at some time. Baird[1] found signs of infection in 42.5 per cent of 1,000 cases studied. Probably these observations err on the side of over-rating the frequency of the condition, and I would consider the figure given by Enge,[6] 7 per cent, as a reasonable estimate.

It is generally believed that pyelitis occurs most commonly during the first pregnancy. Kretschmer and Heaney[8] in a series of 25 cases found 16 primiparæ. In his cases the condition was noted most often during the 4th and 5th months of pregnancy, though it may occur at any time during gestation.

SYMPTOMS AND DIAGNOSIS

The symptoms vary considerably, depending on the severity of the infection and the amount of urinary retention which takes place in the renal pelvis. Cases may be divided into those with only slight rise of temperature, some malaise, and few urinary symptoms; and those ushered in by a chill, fever, nausea and pain in the back. It is cases of this latter type that we as urologists see most frequently. In these cases the pain is more frequently on the right side. Urinary symptoms are generally present and occur in following order: frequency, pyuria, burning on urination, and urgency.

Examination will show costo-lumbar tenderness on one or both sides, often abdominal tenderness, with some voluntary rigidity, will be noted. Leucocytosis is general and pyuria almost a universal finding.

The most frequent difficulty in diagnosis appears to be in cases with right-sided abdominal pain and vomiting, and in which urinary symptoms are not prominent. These cases are frequently admitted to hospital wards as cases of appendicitis. However, the fever is usually higher than is common in appendicitis. Abdominal rigidity is not a marked factor. Costo-lumbar tenderness is generally present, and, what is most important, a definite pyuria will

be found invariably. The milder cases are often overlooked, because of failure to make a microscopic examination of the urine and are considered to be cases of "flu".

TREATMENT

The majority of cases of pyelitis of pregnancy are diagnosed and successfully treated by the physician or obstetrician. The usual treatment in these cases consists in rest in bed and the ingestion of large quantities of water. A good rule, if there is no cardiac condition to contraindicate it, is that a glass of fluid be taken every half hour in the day and every hour, if awake, at night. In addition to this, alkalies should be administered freely, using sodium bicarbonate or potassium citrate in doses sufficient to ensure alkalinization of the urine, as demonstrated by frequent examination with litmus paper.

During this time the action of the bowels should be noted and a mild saline laxative used if necessary. If, as is frequently the case, the symptoms subside and the temperature becomes normal, one may switch in a week or ten days' time to urotropin and a urinary acidifier, the best of which is ammonium chloride. I have seen little benefit from any of the more expensive and complicated urinary antiseptics now on the market. The majority of cases will respond to simple medical measures. However, there is a considerable number of cases in which this form of treatment fails, and in which treatment by urological methods should be considered. These patients frequently have a greater degree of pelvic retention than those whose symptoms clear up on rest, forced fluids and alkalies. This retention is indicated by greater pain and tenderness over the kidney, a higher fever, and more toxæmia than in the milder cases. In these cases ureteral catheterization, with lavage of the kidney pelvis, is the ideal treatment . In most cases, I believe it is advisable to leave the catheter in place for twenty-four to forty-eight hours, keeping it patent by washing with normal saline or boracic solution. I do not believe that the use of antiseptics is necessary or beneficial, though sometimes a weak silver nitrate solution, 1-1,000, or acriflavine 1-3,000, may be used with benefit. In a very small number of cases all these measures fail and in such cases it may be necessary to empty the uterus. I am convinced, however, that this should be necessary only on the rarest of occasions.

PROPHYLAXIS

It seems reasonable to assume that at least some of these infections should be avoided, or at least be discovered in an earlier stage. This should be possible if a routine microscopical examination of the urine is made from time to time during the pregnancy, and when any appreciable number of pus cells is found in a carefully collected specimen a catheter specimen should be obtained for similar investigation. Thus early infections would be demonstrated. Further, all patients who have a history of previous pyelitis as children or during adult life, should have a catheter specimen of urine examined at once to obtain evidence of latent infection. In these early or latent cases suitable urological investigation should be instituted before acute symptoms manifest themselves.

AFTER-TREATMENT

Though it has not been my privilege to follow many cases through after delivery, I am convinced that many of these patients who clear up symptomatically, and carry on satisfactorily through pregnancy to delivery, still have evidence of renal infection for months or years afterwards. It is such cases that make up the relatively small, but definite, group in which pyelitis recurs in subsequent pregnancies. Many of these are patients who have a definite underlying anatomical cause for their infection, such as stricture of the ureter. This has been noted and considered to be a frequent finding by Crabtree[3] and by Baird[1] and by Corbus and Danforth.[2]

These cases deserve and require a thorough urological investigation to determine these underlying factors in the continuance of infection. By finding and eliminating these factors many of these cases can be cleared up and go through subsequent pregnancies without recurrence of their trouble.

CONCLUSIONS

1. There is present in the pregnant woman almost every condition thought to be an etiological factor in pyelitis.

0.498 in a group of normal controls. A comparison of these figures shows no significant variation from the average in the albuminuric group.

The association of varicocele with albuminuria has not received the attention it deserves. The condition, which is nearly always left-sided, is due to back pressure in the spermatic vein. We have found that 19 of the 22 males in the group showed left-sided varicocele. By this we mean that the size of the venous plexus in the left side of the scrotum was more than twice that of the right.

In every instance albumin was absent in the samples voided after remaining in the horizontal and vertical kyphotic postures, while that collected after the lordotic posture invariably contained albumin. In a number of cases albumin was absent in the first specimen, remained absent in the kyphotic postures, only to appear in the lordotic position. It must be remembered that all such patients had shown albumin on one or more occasions previously. We have noted that the specimen was in most cases light in colour, with low specific gravity, suggesting a diuresis in this posture.

TABLE II

	Ch.	*St.*	*Sta.*	*Sc.*	*Cu.*	*Ra.*	*Mcl.*	*Ja.*	*Mc.*	*S.H.*	*E.P.C.*	*Wh.*	*Sm.*	*Elv.*
First specimen.....	++	–	+	trace	trace	++	trace	+	+	–	–	trace	trace	+
Horizontal kyphotic posture.	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Vertical kyphotic posture...	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Vertical lordotic posture....	+++	+	+++	trace	trace	++	trace	++	+	+	++	trace	++	+

This we feel is significant as further evidence of venous stasis in the left renal vein as a cause of albuminuria.

Of the 30 cases studied, 26 showed very definite evidence of lordosis. It is to be noted that even when lordosis is a recognized cause of albuminuria the albumin may not always be present. This is especially true after a meal or after exercise, presumably due, as suggested by Edel,[7] to the venous stasis in the kidney. As has been mentioned above, a low diaphragm in the absence of lordosis may be a mechanical cause of albuminuria. It has been found that albuminuric individuals showing such characteristics behave as do lordotic individuals with the Jehle test.

In Table II are shown the results of the Jehle postural test on some of the persons examined. The urine was tested for albumin with sulphosalicylic acid, adding 5 drops of 20 per cent sulphosalicylic acid to 5 c.c. of freshly passed urine. It will be noted that in

We have thought it of interest to apply this test to patients under our care suffering from subacute and chronic Bright's disease. In Table III we have tabulated the results on a few of these cases. It will be noted that albumin appears in varying amounts in all postures. In no case was albumin absent. It has been stated that functional albuminuria may develop after the albuminuria due to Bright's disease has disappeared, presumably due to the fact that a previously damaged kidney is more likely to excrete albumin with venous stasis than a normal one.

We feel that this test is of value in deciding whether or not the albuminuria which persists in an otherwise symptom-free patient is due to organic renal disease.

Our results on the limited number of cases studied lead us to believe that the postural test is of definite value as a diagnostic aid in differentiating between functional and organic albuminuria.

TABLE III

Patients	*S.Mc.*	*G.E.*	*Ha.*	*Sh.*	*Lo.*
First specimen	+++	++	trace	trace	+++
Horizontal kyphotic ...	+++	++	trace	trace	++
Vertical kyphotic	++	+	trace	trace	trace
Vertical lordotic	+++	+	trace	+++	+

SUMMARY

Albuminuria is a common finding in growing young adults. Its presence has been taken too often as an evidence of Bright's disease. The tests hitherto commonly used to distinguish functional from organic albuminuria have been unsatisfactory.

A test as described by Jehle has been carried out by the authors on a series of young persons with albuminuria. We believe this to be the most satisfactory yet devised.

As evidence of the importance of a mechanical factor in functional albuminuria, lordosis and varicocele were common findings. Albuminuria may exist in the absence of lordosis, due possibly, as Jehle has pointed out, to pressure on the inferior vena cava by a low diaphragm.

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THE PYELITIS OF PREGNANCY*

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THE pyelitis of pregnancy presents a number of problems of interest both to the obstetrician and to the urologist. In the majority of instances no premonitory symptoms or signs are recognized, and as a consequence the condition is usually well established and relatively severe in type before a diagnosis is made. The factors influencing its incidence, therefore, must be analyzed in order that we may adopt more efficient means of avoiding the occurrence of the disease, and when it does occur may recognize it earlier, better understand its cause, and promptly apply suitable therapy.

PREDISPOSING CAUSES

The pregnant woman presents many of the conditions looked upon as important factors in the causation of renal infections. Most of these are commonly seen in simple pyelitis, while others, notably marked urinary stasis in the ureter and kidney pelvis, are more distinctly associated with the pyelitis of pregnancy.

Urinary stasis. — Seng,[13] Kretschmer,[7] and Prather and Crabtree,[11] amongst others, have made extensive studies of the urinary tract during pregnancy and all have found that marked dilatation of the ureters and renal pelvis occurs almost invariably in pregnant women. Seng found that such dilatation of the ureter commences as early as the sixth week in multiparæ, and the ninth week in primiparæ, reaching its maximum in the 22nd week during the first pregnancy, and in 24 weeks in those who have previously borne children. Dilatation of the right ureter occurred in 100 per cent of pregnant women, while the left ureter was involved in two-thirds of the patients studied. Though not quite so frequent as ureteral dilatation, pyelectasis was noted very commonly. Stasis of some degree was noted in the majority of cases, the emptying time for the renal pelvis after pyelography often being in excess of 60 minutes.

Prather and Crabtree disagree with the observation as to the greater frequency of ureteral dilatation in multiparous women, and consider that it is not so much the number of pregnancies that influences the dilatation as the frequency with which they occur, the short interval being insufficient for complete involution and satisfactory regaining of ureteral tone. In the experience of these authors and others, changes in the ureter and renal pelvis are more commonly seen during the first and second pregnancies. One further observation may be made with regard to ureterectasis. If one studies pyelo-ureterograms made in pregnant women one finds that the dilatation cannot be traced below the point where the ureter reaches the adnexa. Cumston[4] and others have pointed out that dilatation is never noted below the brim of the pelvis.

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obtain a dry ear is through the Eustachian tube remaining open. This is generally due to incomplete removal of the mucous membrane from the tympanic end of the tube. The idea of curetting the tube is to remove the mucous membrane so that the tube fills up with granulations and forms a solid barrier. This happens in a certain proportion of cases, but in others the tube remains wide open and again becomes lined by columnar ciliated epithelium. Round curettes are not so efficient as the square curette of Alexander, which fits more or less accurately into the tube. It is probable that in many cases a strip of epithelium is left in the angles of the tube, which is square in section, and these islets rapidly proliferate and cover the raw surfaces in the tube before it has had time to granulate and close by cicatricial contraction. Columnar ciliated epithelium has the power of very rapid proliferation, and this is apparently stimulated by any inflammation, such as nasopharyngeal catarrh. When the tube remains open there is a tendency for the mucous membrane to spread from the tube into the tympanic cavity itself, so that a large part of the anterior end of the tympanic cavity is lined by moist secreting mucous membrane covered with columnar ciliated epithelium.

The hypotympanum is another area which is apt to remain moist after a radical mastoid. It is a space of variable size lying below the level of the external auditory meatus, and is part of the tympanic cavity and lined by mucous membrane. Its floor forms the roof of the jugular bulb and it communicates with the mastoid cells through the sinus tympani. This latter is a large ovoid cell lying immediately medial to the descending part of the facial nerve and in the closest possible proximity to it. The ampulla of the posterior semicircular canal lies very close to the sinus tympani on its medial side.

In order to get rid of all the infection and mucous membrane in the hypotympanum it is necessary to lower the floor of the external auditory meatus with the gouge, after which the floor may be more easily curetted. The opening of the sinus tympani must be curetted also, but it is not possible to curette right into it on account of its location and the danger of injuring the facial nerve and the posterior semicircular canal. However, if the front of the facial ridge is well planed down the postero-inferior angle of the cavity can usually be fairly thoroughly cleaned.

Another of the causes of persistent discharge in the hypotympanum is a partial shutting-off of the cavity by the remains of the lower edge of the drum membrane. Brunner[1] found some remnants of the drum in most of the cases he studied microscopically and in one of them the lower part of the cavity was completely shut off by a membrane which was composed partly of the remnant of the drum which was firmly adherent to the promontory. The lower cavity was lined by ciliated epithelium.

Probably the reason why we do not have more trouble with the bottom of the cavity is that in chronic cases a large part of the tympanic cavity is obliterated by swelling of the submucous layer accompanied by cicatricial changes. It is owing to this that we do get good results in many cases. The roughnesses of the cavity are already largely filled up with submucous tissue, which is myxomatous or fibrous, and curetting will remove most of the mucous membrane successfully. It would be manifestly impossible to get a case with a normally developed cell system so smooth and free from mucous membrane as to get a dry ear.

It is fortunate in one respect that most of the cases which require radical mastoid operations are of the infantile type, with very rudimentary pneumatization, so that it is generally possible to eradicate most of the mastoid cells. When we consider that many cases with normally developed cell systems have cells partially encircling the labyrinth we realize that in such cases it would be quite impossible to clean them all out.

The researches of Cheatle, and, later, of Wittmaack, have thrown much light on the underlying factors tending to chronicity of infections. They have shown that the sclerotic mastoid is really an infantile type in which the normal development of the air cells has been arrested. Not only is the bony structure infantile in type, but Wittmaack has shown that the mucous membrane is also of the infantile type, with a large subepithelial cushion of myxomatous tissue in place of the very thin layer of the normal type. This

infantile tissue has less vitality than the adult, which probably accounts for the tendency to chronicity after the occurrence of infection in the middle ear.

Some areas in the mastoid part of the cavity have a tendency to remain raw. Some of these may be islets of mucous membrane, but others are undoubtedly due to small areas of caries in the underlying bone, which had been overlooked at operation. I have had one or two cases in which the outer wall of the antrum remained raw for months when all the rest was healed. In one of these cases the patient had suffered from furunculosis of the meatus a short time previously and developed a bad staphylococcal infection of the soft parts after the operation.

What is the state of the average clinically successful radical mastoid cavity? The tube may or may not be closed. There are many cases which remain closed for some months after the operation and then later become open again. Many of them remain dry except when the patient has a cold. The tympanic cavity and promontory are lined by a pearly white or pale pink covering which may be slightly moist. It has been shown microscopically that this is epidermis with a variable amount of cicatricial tissue underlying it. In a recent microscopic study of the after-effects of radical operations Brunner has shown that there are numerous small cysts in the subepidermal layer, which are lined by either cuboidal or columnar ciliated epithelium. The niches of the windows are more or less filled up and smoothed off by this new tissue. The attic, antrum and mastoid parts of the cavity are similar, but in old cholesteatoma cases where the matrix had been left the epithelium penetrates deeply in places by solid buds and here and there forms small secondary collections of cholesteatoma under the lining. As a rule there is no osteitis under an intact epidermal covering, but Neumann has shown that fresh osteitis can occur under an intact covering in an old healed mastoid. This may account for those fortunately rare cases in which labyrinthitis occurs some years after the operation. Old radical mastoid cavities are generally found to contain a fair amount of desquamated epithelium and wax, and if the ear has been neglected for a year or more it may be extremely difficult to remove this. After removal of a large plug we generally find that the cavity is denuded of epithelium in spots, leaving a granulating surface. If neglected further the secretion from the raw area will produce maceration of much of the remaining epithelium, but if treated it can usually be induced to heal readily.

Let us now consider the mastoid cavity which persistently discharges. We may have mucopus coming from the tube owing to persistent tubal catarrh which in turn may be kept up by an undiscovered sinusitis or by adenoids. A large part of the tympanic cavity may be covered by a moist secreting surface which is usually composed of columnar ciliated epithelium over a substratum of granulations. Such cases will discharge for years unless they are reoperated on and the mucous membrane carefully curetted out. Even then it is very difficult to get every vestige of ciliated epithelium away on account of the irregularities and niches in the lower part of the cavity. The columnar epithelium grows with great rapidity and quickly covers the raw surface again. According to Brunner, there is very frequently active osteitis under this membrane. Where the ciliated mucous membrane meets the epidermis there is a great tendency for the formation of exuberant granulations and polyps.

I would like to digress here for a moment. Normally, the mucous membrane of the tympanic cavity is composed of cuboid epithelium with only small areas of columnar ciliated epithelium near the tubal orifice. However, it was demonstrated years ago by Manasse[2] and has been repeatedly observed since that in acute otitis media the whole cavity is lined by ciliated epithelium. This is a curious phenomenon for which I have not heard any very satisfactory explanation. It almost appears as if infections stimulate the growth of ciliated epithelium or transform the cuboidal into columnar ciliated.

Another reason for an unsatisfactory result is that the facial spur persists in granulating and produces a stenosis of the posterior part of the cavity, causing incomplete drainage and aeration.

TREATMENT

Prevention.—As already mentioned all cases with chronic middle-ear discharge are not

and whatever time is necessary should be taken to eliminate secondary infection and inflammatory reaction. Blood transfusions are valuable in secondary anæmia and in the building-up of the general health. Radium and x-ray treatment are doomed to failure in the presence of a dirty mouth or secondary infection. Experience teaches the necessity of careful preparation and the folly of too early, or precipitate, radium application.

Following radium and x-ray treatment there is a period of reaction starting about the end of the first week and increasing in severity during the second and third weeks, the whole process taking six to eight weeks. The parts are reddened, œdematous, and swollen—inflammatory reaction. The surface has a white diphtheroid coating. The condition often looks worse than at any time during the disease. This is necessary to healing by radium and x-ray. The patient should be warned, and the referring physician thoroughly conversant with these effects. Care of the parts during this period of reaction is simple and effective. *Frequent and copious mouth washes and irrigation* with saline solution or hot, soapy water should be prescribed, with borated vaseline or other mild emollient as a topical dressing. All irritants, such as chemical solutions or extremes of heat and cold, should be avoided. If needed, a mild opiate or other sedative may be given to relieve pain.

The after-care is simple. Avoid irritation, particularly from tobacco; keep clean and healthy; observe sufficiently long to make certain of final cure. A tongue or mouth fully restored is the final answer to all questions and doubts. There is no single location more amenable to effective treatment. Mouth cancer need no longer be dreaded if detected early. Cure is possible.

TECHNIQUE

The results depend somewhat on the location of the lesion. The cheeks and anterior half of the tongue are accessible to radium element or radon-seed implantation from within or without. The floor of the mouth, the under surface of the tongue, and the gums we have found respond better to topical application than to radium implants. Topical applications in 1 mm. platinum containers are preferred in all cases where the lesion is close to or involves bone or cartilage; thus there is less danger of secondary infection. Electro-coagulation immediately following radiation frequently eliminates pain and promotes a more rapid resolution with less danger of infection.

The tonsils, pharynx, and soft palate are best treated by radon seeds or radium element needles. Personally, we prefer platinum needles of 0.5 mm. or more filtration and 1 or 2 mg. radium-element content at 1.5 to 2 cm. distance for 100 mg. el. hrs., to radon implants or surface applications. The posterior third and base of the tongue are difficult of access. Gold radon seeds of 0.5 mm. filtration and 2.5 millicurie content, or needles of 1 to 3 mg. radium-element content are implanted at 1.5 to 2. cm. distance, the latter for 100 mg. el. hrs. During treatment the inserts, needles, or otherwise, must be completely submerged, the parts kept at rest, and frequent forced irrigations ordered. There is remarkably little discomfort or pain. Local anæsthesia should be used when possible.

All cases of tongue, floor of the mouth, tonsil, and pharyngeal cancers are given supplementary x-ray to the submaxillary areas and neck triangles. Full erythema doses to both sides are routinely given, whether the glands are palpable or not. A complete x-ray series precedes actual radium treatment and a subsequent series is given at two months' interval when indicated.

INTRA-ORAL CARCINOMA

Year	*No.*	*Glands*	*Path. Report*	*Dead*
1926	23	8	2	16
1927	20	7	3	11
1928	21	7	7	13
1929	26	10	6	13
1930	28	7	4	15
1931	38	6	13	10
	156	45	35	78

The Table above records 156 cases of intra-oral carcinoma observed over a period of six years, 1926-1931 inclusive. Of these, 45, or 28.8 per cent, had palpable submaxillary glands on one or both sides. Cases presented themselves in all stages of the disease, but a considerably higher percentage of early cases was

treated in the past two years. Seventy-eight, or exactly 50 per cent of all cases, are dead. About 10 per cent of these died of intercurrent disease without evidence, so far as we could ascertain, of local recurrence. Not a single patient with involved glands lived for more than three years and 75 per cent showed recurrence within one year.

The cosmetic result in all cases was excellent. There was no limitation of movement or interference with speech, even in those cases with considerable portions of the tongue involved. There was no operative mortality, while in those cases so far advanced as to be inoperable, temporary relief from pain delayed or obviated the need for opiates and gave a measure of palliation which, we believe, could not have been obtained in any other way.

SUMMARY

1. X-ray, radium, and surgery offer the best means for the treatment of intra-oral cancer.

2. Radium and x-ray treatment requires further study and improved methods of application.

3. Specialization is necessary for proper treatment by x-ray and radium.

4. Successful treatment by radium and x-ray is contingent on a complete and careful oral preparation.

5. Physicians should be conversant with the after-effects of radiation and their proper treatment.

6. Radium and x-ray end-results are comparable with the best. The method has the advantage of ease of application, accuracy, a minimum of discomfort, and the restoration of the parts to a normal appearance.

CAUSES OF PERSISTENT DISCHARGE FOLLOWING THE RADICAL MASTOID OPERATION

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WHEN I was an intern, something over 20 years ago, radical mastoids were very common in the hospital clinics. Even in those days, however, my chiefs did only two or three of these operations on their private patients in the year. The inference from this fact was that chronic middle ear suppuration was a disease of neglect and could be prevented by some care. We have since had no reason to change this opinion. There is undoubtedly much less middle ear suppuration now than at that time, and this is largely due to the more intelligent attitude of the public in getting prompt treatment for their ear infections and not allowing them to become chronic. Nowadays a radical mastoid operation is becoming something of a rarity, and one with intracranial complications even more so.

With regard to the indications for operation, those cases in which the infection is mainly tubal or kept up by a persisting nasal or nasopharyngeal infection from the nasal sinuses or from adenoids are not the most suitable for a radical mastoid operation. If a radical mastoid is performed before the other condition is cleared up both the operator and patient are bound to be disappointed. It must be remembered that, although we, as surgeons, look on the radical mastoid as a means to eradicate a dangerous focus of infection with fatal potentialities, the patient, on the other hand, is usually more interested in the cessation of the discharge, and if the cavity continues to discharge, even though the surgeon's aims have been fulfilled, the patient probably feels that the operation has been a failure.

Cases in which a radical mastoid operation is pre-eminently indicated are those in which the disease is mainly located in the attic, aditus or antrum. These usually have a marginal perforation either in Shrapnell's membrane or in the postero-superior quadrant of the drum membrane. Many of these have cholesteatoma, which may or may not be visible before operation. I need only mention in passing those cases of chronic middle ear suppuration with acute exacerbations or those with impending or present intracranial complications in which operation is imperative.

Probably the commonest cause of failure to

glands may be felt through the abdominal wall, although this is infrequently encountered.

With so many different pathological entities, it must be apparent that there can be no distinctive clinical picture of abdominal Hodgkin's disease, either insofar as the history or the clinical examination is concerned. The disease may resemble almost any intra-abdominal pathological state, and the diagnosis can be made only by considering it in the differential diagnosis and by excluding other possibilities. In young adults we have seen confusion arise between abdominal Hodgkin's disease and tuberculous peritonitis. If exploratory laparotomy is not resorted to the diagnosis can be arrived at only by observing the patient for some months, and by noting the effects of irradiation with ultra-violet rays. The complete list of possibilities to be considered in the differential diagnosis is a rather long one. Typhoid fever, brucella abortus infection, or a low-grade septicæmia may be mistaken for abdominal Hodgkin's disease. Pyelitis or pyonephrosis sometimes create difficulties in the diagnosis. This occurred in the second of our cases when it was impossible to distinguish between an enlarged spleen and an enlarged left kidney. Carcinoma of the colon or of the stomach with the accompanying fever, cachexia, anæmia, malnutrition and occasional ascites may resemble closely abdominal Hodgkin's disease. In each of the above instances a careful investigation of the case will generally disclose some point of difference between Hodgkin's disease and the confusing factor. Therefore the diagnosis of abdominal Hodgkin's disease must often be made by exclusion.

The following is a summary of the clinical and laboratory data on the two cases of abdominal Hodgkin's disease which were observed at the Royal Victoria Hospital and at the University of Michigan Hospital about one year apart.

CASE 1

H.G. (Dept. No. 58403), age 49, male, was admitted to the Royal Victoria Hospital on March 12th, 1931, and was discharged on May 19th, 1931. He was re-admitted August 6th, of the same year, and died twelve days later. The chief complaints on the first admission were weakness and cough. The patient dated the onset of his illness to November, 1929, when diarrhœa appeared and lasted five or six weeks. Weakness came on at about the same time and was progressive. Cough started three weeks prior to admission. It was non-productive. A loss of thirty pounds occurred since the onset of the illness.

Physical examination showed the patient to be emaciated. A few soft, discrete, slightly enlarged glands were felt on the left side of the neck at the insertion of the sterno-mastoid. With the patient on his right side, the tip of the spleen could be felt. The liver was not palpable. A few pea-sized glands were felt in both axillæ. The blood picture showed a moderate severe secondary anæmia with the following count: polymorphonuclear leukocytes 84.5 per cent; eosinophiles 1 per cent; mast cells 0.25 per cent; monocytes 7.7 per cent; lymphocytes 6.5 per cent. Dr. T. Waugh believed that the blood picture suggested Hodgkin's disease. Biopsy of a gland on the left side of the neck showed Hodgkin's disease. The remaining examinations were negative. During the patient's stay in the hospital, the temperature ranged between 97 and 104.4°, with a pulse rate of between 70 and 110. The patient was confined to bed throughout the period of his stay in the hospital.

At the time of the second admission it was evident that the patient's condition was worse than when he was first seen. Swelling of the feet and enlargement of the abdomen had both appeared since he was discharged. In addition the patient had suffered from several attacks of paroxysmal dyspnœa. Physical examination at this time was much the same as previously except for œdema of the ankles, an enlarged liver, and ascites. The patient grew progressively worse following admission and finally died. The post-mortem examination which was restricted to the abdomen revealed the following features. The liver was enlarged and studded throughout with nodules of different sizes. The spleen likewise showed the presence of what appeared to be metastatic areas. The pancreas, adrenal medulla, and jejunal wall were all involved by the same process. The histological picture of the nodular areas was that of the so-called sarcomatous Hodgkin's disease.

CASE 2

G. McL. (Hosp. No. 233233), age 48, male, was admitted to the University of Michigan Hospital on Jan. 22nd, 1930, and died on March 13th, 1930. The chief complaint was weakness. The patient dated the onset of his illness to the last week of October, 1929. At that time he passed through an illness which was characterized by weakness, chills, fever and sweats. He was in bed a few days and was soon able to return to work. He did not regain his strength however. During the next two months there were numerous short attacks of fever, ranging between 100 and 101°. A loss of twenty pounds had occurred since the onset of his illness. There had been no gastro-intestinal symptoms. Physical examination at the time of admission showed a poorly nourished individual with pallor. The abdomen was scaphoid, and there was no ascites. In the left upper quadrant there was a hard mass with an edge which descended with respiration. Opinions were divided as to whether this was spleen or left kidney. In the right hypochondrium there was a suggestion of a mass, although spasm of the recti made palpation unsatisfactory. There was no enlargement of the superficial lymph glands. The urine showed albumin on some of the examinations. The Kahn test was negative. The blood picture revealed a mild secondary anæmia, with 81 per cent polymorphonuclear leucocytes, 2 per cent lymphocytes, and 17 per cent monocytes. A barium enema showed the suggestion of a mass pressing upon the median border of the descending colon.

The patient's course in the hospital was progressively down hill. His temperature ranged between 97 and 103.5°. It was mainly of the remittent type, though occasionally it became intermittent. On February 15th, a bulging in the left flank was first noted, with some pitting œdema over the lower back and left flank. During the last two or three days of his stay on the medical ward, the patient was irrational and vomited. Splenectomy was performed by Dr. Hugh Cabot on March 8th. At operation the spleen was found much enlarged with nodules in its substance in the upper portion. The liver was explored and found to be apparently normal. There was a moderate amount of clear fluid in the abdomen. The pathological report by Dr. Carl V. Weller was "Repeated staining for tubercle bacilli was negative. The microscopic sections showed sarcomatous Hodgkin's disease with areas of caseous necrosis."

SUMMARY

1. The various views held regarding the etiology of Hodgkin's disease are presented.

2. The importance of splenomegaly in abdominal Hodgkin's disease is stressed.

3. The significance of hepatic enlargement in this condition is briefly discussed.

4. Attention is called to those instances in which Hodgkin's disease involves the gastro-intestinal tract.

5. The various conditions are discussed which may be confusing factors in the diagnosis of abdominal Hodgkin's disease.

6. Two of our cases are recorded in which the predominant localization was in various abdominal organs in the first case, and in the spleen in the second patient.

It is a pleasure to acknowledge the cooperation of Drs. Cyrus C. Sturgis and Carl V. Weller, and of Dr. J. C. Meakins, Professor of Medicine, McGill University, and Dr. William Chase of the Pathological Institute of McGill University.

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THE RADIATION TREATMENT OF INTRA-ORAL CANCER*

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IV

MODERN scientific medicine offers two methods, and two only, of successfully treating intra-oral cancer—surgery and radiation. The success or failure of either method is determined by the anatomical extent of the lesion. Permanent cure demands early diagnosis. Failure follows if complete eradication is not possible. Since the majority of cases report too late to satisfy this condition, there are many failures and will continue to be until new methods of treatment are found or the primary cause of cancer discovered. Cancer is a controversial subject. There is no general agreement as to its cause or cure. We still investigate, hoping to arrive at a final solution. Until then, we must avail ourselves of the agencies at hand.

Surgery, with a century or more of challenge and combat, has progressed far towards its best. Radiation therapy by x-ray and radium has proved its worth, and has established itself firmly as an active and trustworthy agent. Its failures are many, as are those of surgery. Its challenge to-day is for further clinical research and improved methods of application. Its future no one can foretell, but its promise, based on past achievements, is bright. Whatever agent is accepted must prove its worth in final results. We have arbitrarily set a five-year cure-interval as a standard. Statistics from varied and reliable sources give to these agents a curative factor not exceeded by any, but there can be no final judgment until large numbers of cases have established a safe and sane basis of treatment.

Radiation therapy frequently requires surgery of access or plastic end-surgery, and surgical diathermy is a valuable adjunct. It is not exclusive, but in its favour is the fact that it may be used either alone or with any other accepted means. Both surgical and radiation specialization are necessary, but, if one must choose, a specialized radiation training is preferable, since to-day competent surgeons, actually and relatively, many times out-number the specialists in radiation therapy. In actual practice present-day conditions call for both in closest cooperation as consulting specialists.

Oral cancer constitutes about 10 per cent of all cancers and predominates in the male sex. Success with radium and x-ray therapy is contingent on a complete and careful oral preparation. No mouth should be treated until thoroughly cleansed. Adequate asepsis is essential. The period of preparation is quite as important as that of treatment. All foci of infection, especially decayed and infected teeth, must be removed. The mouth must be clean

* Preceding articles in the second series on physiotherapeutical subjects can be found in the *Journal*, 1932, 27: 521, 612; and 1933, 28: 30.

ABDOMINAL HODGKIN'S DISEASE

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HODGKIN'S disease has presented numerous difficulties to the pathologist since it was recognized as a clinical entity by Thomas Hodgkin in 1832. Students of the etiology of the disease have been divided in their opinions, one group regarding the disease as being neoplastic in origin, another group believing it to be infectious in nature. One of the chief exponents on this continent of the first view has been Warthin[1] who emphasized, in a paper published shortly before his death, the relationship between Hodgkin's disease and the aleukæmic and leukæmic lymphoblastomata. He cited two interesting instances of the transformation of the pathological picture of Hodgkin's disease into that of myeloid leukæmia, after Roentgen ray therapy. Warthin did not state however whether the blood picture in these two cases was likewise changed. In six other patients Hodgkin's lymphoblastoma developed into lymphatic leukæmia, although here again it is not possible to say precisely what changes occurred in the blood. Since the leukæmias are so often regarded as neoplasms with coincident hæmatological manifestations, the above observations are significant and lend weight to the assumption that Hodgkin's disease is a new growth. Bunting and Yates[2] on the other hand, have been the most prominent exponents of the infectious theory as applied to Hodgkin's disease. At one time they maintained that a bacterium which they had discovered in the glands of patients with Hodgkin's disease was responsible for the disease. But this finding has not been corroborated by other workers. Another view held is that the tubercle bacillus is responsible for the pathological picture of Hodgkin's disease. However, this idea has not been accepted in this country nor in the United States.

Just as the etiology of Hodgkin's disease is obscure, so the clinician often sees cases of this malady which furnish difficulties in diagnosis. None offer more diagnostic difficulties than do cases of so-called abdominal Hodgkin's disease. Abdominal Hodgkin's disease may be defined as that syndrome which is characterized by the predominant localization of the pathological process of Hodgkin's disease in one or other, or in several, of the abdominal organs. The organs or tissues involved may include any glandular organ in the abdomen or any portion of the gastro-intestinal tract. The condition often simulates to a varying degree the typical cases of Hodgkin's disease, when the diagnosis is relatively simple. Thus we may see in abdominal Hodgkin's disease weakness, loss of weight, pruritus, attacks of intermittent fever of the Pel-Ebstein type, with in addition those symptoms which are a mechanical result of the involvement of any of the abdominal viscera.

Splenic enlargement.—This finding was present in both of the cases reported in this paper. In the first case splenomegaly was the only piece of objective evidence which pointed to a possible diagnosis of Hodgkin's disease. In the second patient the edge of the spleen was palpable during the first admission to the hospital, and in this instance also led to the suspicion of the presence of Hodgkin's disease. In almost all cases of abdominal Hodgkin's disease reported in the literature the spleen has been found to be enlarged. There were three cases in Warthin's series in which an enlarged spleen was the most outstanding feature. Following splenectomy there occurred a generalized spread of the disease, but at the time of operation it was apparently localized to the spleen. In a careful study of 24 cases of Hodgkin's disease, Barron[3] found splenomegaly to be an important characteristic of the abdominal form. Parkes, Weber and Bode[4] and Muller and Boles[5] reached the same conclusion following an analysis of their cases. In certain types of the abdominal disease, to be referred to later, the spleen does not enlarge, so that without any enlargement of the superficial glands it is impossible to make a correct clinical diagnosis. A patient who presents only a large spleen and fever should be suspected, at least, of abdominal Hodgkin's disease, after some of the acute infections have been excluded.

Enlargement of the liver.—Most authors do not place as much emphasis on hepatomegaly as they do on splenomegaly, because of the difficulty in evaluating the correct significance of the liver enlargement. One may find a definitely enlarged

liver in an individual without ever discovering the specific cause for the enlargement. This applies particularly to those instances in which no nodules are felt on the surface of the organ. In our first patient the liver was not enlarged, while in the second one there was a definite increase in size, with numerous nodular areas scattered throughout the substance of the liver. Two of Warthin's patients revealed predominant, though not exclusive, localization of the lesion in the liver. In over one-half of Barron's cases the liver was enlarged beyond 1850 grams, but this factor proved of little assistance in the clinical diagnosis. Muller and Boles, in their comprehensive and critical summary of abdominal Hodgkin's disease, maintain that the liver may be the seat of secondary deposits but that it has almost never been observed as the primary focus of the disease. A symmetrically enlarged liver does not carry nearly the same implications with it that an enlarged spleen does.

Involvement of the gastro-intestinal tract.—Perhaps the most interesting cases of the group in this review are those which are confined largely to the gastro-intestinal tract. A pre-operative or ante-mortem diagnosis is extremely difficult in such instances. Generally the clinical features simulate carcinoma of the bowel, and this is the diagnosis made. Our first patient showed 'lymphogranulomatous' changes in the jejunum. There was also an ulcer of the gastric mucosa, which may well have been the result of infiltration of Hodgkin's disease. Barron cites one case in which there was an extensive tumour about the rectum, but he does not state whether lesions were present elsewhere. Parkes-Weber and Bode's patient showed two ulcerated plaques of Hodgkin's disease in the jejunum, but in this case there was in addition advanced disease elsewhere in the abdomen. Venables[6] has reported a case in a female of 59 years in whom there was roentgenological evidence of an obstruction at the duodeno-jejunal junction and in a loop of intestine in the left iliac fossa. Operation revealed a nodular mass infiltrating the small intestine at the site of the distal obstruction. There were a number of enlarged glands in the mesentery with no sign of Hodgkin's disease elsewhere in the abdomen. Tschilov[7] records an instance in a male in whom the diagnosis after both clinical and roentgenological examination was carcinoma of the stomach. Autopsy showed a large mass of glands infiltrating the posterior wall of the stomach and producing a large ulcer. Microscopic examination of the glands showed the picture of Hodgkin's disease.

Involvement of abdominal lymph glands.—Because Hodgkin's disease is primarily a disease of the lymphatic tissue, one would expect the abdominal lymph nodes to bear the brunt of the disease in the abdominal type of Hodgkin's disease. Except in those infrequent instances in which only the spleen or some localized part of the gastro-intestinal tract is involved this is actually the case. The literature we have reviewed supports these views. The glands may be discrete, but in the advanced stages they may be adherent to each other or to some abdominal viscus. Thus may be produced various confusing clinical syndromes. Occasionally the enlarged

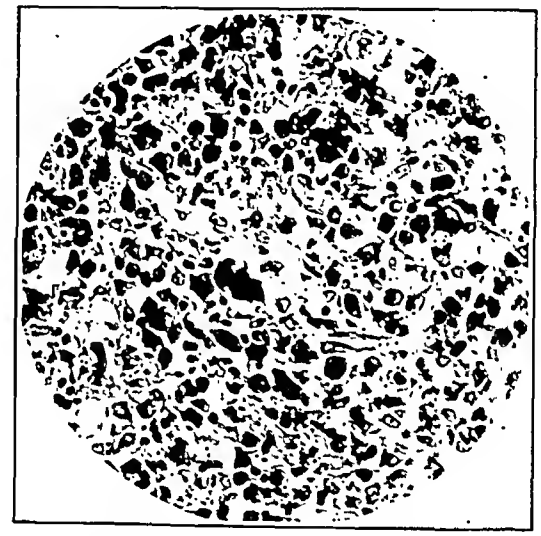

FIG. 1.—A high magnification of the spleen in Case 1, showing the replacement of the normal architecture by immature lymphoid tissue and giant (Dorothy Reed) cells.

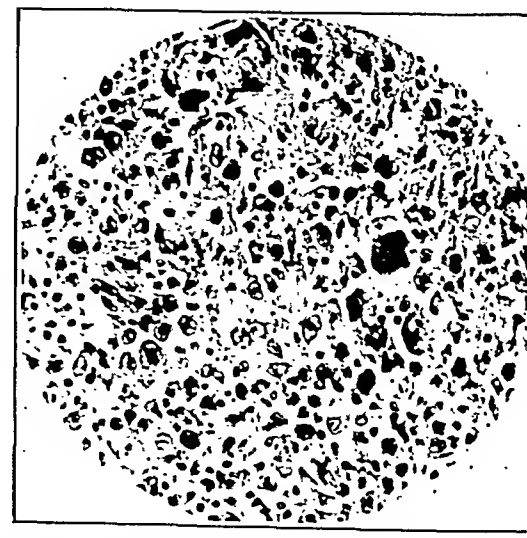

FIG. 2.—A section of spleen from Case 2, with high magnification. Note the similarity between this and Fig. 1.

suitable for treatment by a radical mastoid. Those in which a radical mastoid is unnecessary and apt to give a poor result are those with a central or anterior perforation and thick stringy mucoid secretion, indicating that the continued discharge comes mainly from the tube. Most of these cases can be cleared up by conservative means. Speaking broadly, one may also say that mastoids with a well developed cell system very seldom require a radical operation, and if they do the cavity is so large that it takes an exceedingly long time for the epidermis to grow over the surface. Also, almost invariably numerous islets of mucous membrane are left which grow and produce some secretion.

Cases in which a radical operation is indicated are those with suppuration in the attic or antrum, with foul discharge, and with a marginal perforation, which do not clear up with conservative treatment. Cases with cholesteatoma should all be operated on, either by the ordinary radical or a modified radical method. The presence of an acute exacerbation or symptoms of intracranial complications are of course an absolute indication for operation.

There are few operations in which scrupulous care in the technique of the operation is so important in order to obtain a satisfactory result. Each step must be carried out with care. Particular attention must be paid to planing down the facial spur to the utmost possible limit, and to the thorough removal of the whole outer wall of the attic. The floor of the inner end of the meatus must be lowered to expose the hypotympanum and remove the remnants of the drum membrane. All the mucous membrane must be removed from the tympanum by careful curetting, not forgetting the entrance to the sinus tympani. I was interested to see some years ago that Sir William Milligan[3] stated that he did not curette the tympanic cavity for two reasons, namely, that he was afraid of tearing out the stapes and that he believed his patients heard better with a moist cavity than a dry one. The Eustachian tube must be thoroughly curetted to remove every trace of mucous membrane from the tympanic end, bearing in mind the close proximity of the carotid artery and its venous plexus below and the dura above.

Various elaborate procedures have been devised by Beck, Norval Pierce, and others for the closure of the tube, but hitherto they have not been widely adopted. The mastoid part of the cavity must be smoothed off as far as possible, so that the epithelium will have a smooth surface to grow over. Most authorities are agreed that skin-grafting shortens the period of healing considerably and minimizes the likelihood of the growth of exuberant granulations which would be likely to cause stenosis of part of the cavity. I may mention here that a year or two ago I did a radical mastoid on a boy in whom there was very good primary healing. The skin graft grew and covered the promontory and a large part of the mastoid cavity. However, as weeks passed there was always some discharge the origin of which I could not determine, as the cavity appeared to be healed. I finally discovered that there was quite a space behind the skin covering the promontory. On removing the web of skin a fair sized cavity lined by wet mucous membrane was found. The graft had apparently stuck to a fragment of the drum.

It is important in making the meatal flaps that the opening should be wide enough to see into all parts of the cavity. There are many types of meatal plastic and it is immaterial which one is employed, provided that it gives a wide enough meatus.

Asherson[4] uses a graft of temporal muscle to fill up the mastoid cavity in many of his cases. This strikes me as being an improvement in technique, as muscle is very vascular and would be sure to survive. I have not yet had an opportunity of trying it.

In a discussion on the radical mastoid in the American Otological Society, in 1928, Leon White particularly stressed the importance of following up the cases after leaving hospital and getting them to report twice yearly for an inspection of the cavity. Keeler and others others agreed very strongly with this view. There is no doubt that all radical mastoid cases require a little attention once in a while, if only to have the wax and epithelial scales removed, and if there should be a little moisture some alcohol drops or some other medication will usually dry it up.

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Clinical Conferences

CANCER OF THE STOMACH

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In approaching a case one must remember that he is the physician and that the patient has come because there is something wroug; consequently the physician has a great responsibility. He must intelligently seeure all the facts of the history, filtering the real facts from the imaginary. He must foeus these facts on the organ to which they belong, and then proeeed with a careful physical examination. By that time he is probably ready to call to his assistanee some of the subsidiary aids to diagnosis. A great many people in these modern days are proue to resort to these subsidiary aids first. I think this is a mistake. Then the patient wants to know the eause of his trouble, and the physician must faee the facts and help his patient to do the same.

In eancer of the stomach it is neeessary first to know something of the physiology of the stomach and of the usual anatomieal relatious to the surfaee of the abdomen as well as to its nerve supply. It must also be borne in mind that caneer of the stomaeh is not a rare disease. In 1929 in the United States 111,569 deaths from eancer were reported, and of these about 40,000 were cancer of the stomach, and of these 40,000, 8,000 were in women. Many who are reported as dying of cancer of the liver began originally with cancer of the stomach. The disease is most common between the ages of 40 and 60; I have seen it in people as young as 20 years, and some of my most satisfactory cases have been 70 years and over.

Dr. Charles Mayo, in a paper some time ago, suggested that about 40 per cent of gastric ulcers become cancerous, or perhaps are cancerous from the beginning. Moynihan puts it at 50 per cent. Ninety per cent occur within the pyloric third of the stomach, and 75 per cent of these along the lesser curvature, which is really the dependent part of the stomach; consequently it is the dependent part of the stomach that is more prone to cancer, just as the dependent part of the intestine, the rectosigmoid, is probably the most common site. About 4 per cent occur on the posterior surface of the stomach, and about 7 per cent occur at the pyloric ring. Only about 3 per cent are found at the cardiac end, and this is fortunate, because they are extraordinarily difficult to diagnose.

Cancer of the stomach spreads either by direct extension, that is, by contact with another viscus or with the abdominal wall, or through the lymphatic stream along the lesser curvature, and sometimes by the portal circulation. Pain is a rare symptom of cancer of the stomach in its early stage. When one remembers that the stomach gets its nerve supply from a special nerve, the pneumogastric, from the sympathetic system, and just a few fibres of sensory nerve that join with the sympathetic, it helps one to realize why there should be no pain. For instance, in resecting the stomach under local anæsthesia where the patient's condition precludes the possibility of a general anæsthetic, when the clamps are put across the stomach, the abdominal wall and the omentum having been anæsthetized by local anæsthetic, the only complaint I have ever heard a patient make was: "Look out, Doctor, I think I am going to vomit!"

In examining the patient one must bear in mind the chemical constituents of the gastric juice, the hydrochloric acid and the pepsin. Has anything happened mentally or functionally to disturb the secretion of the hydrochloric acid and the pepsin? One must realize just what digestion is. It is well to remember the effect on the chemistry of a well balanced meal: something hot in the way of soup, the main course with plenty of fluid, to have chyle well developed; then the sweet or ice at the end. It must be remembered, too, that the peristalsis in the stomach converts the stomach during the process of digestion into merely a mixing basin, very little absorption of food taking place while it is in the stomach.

When the patient describes his symptoms one is struck by their indefiniteness; it is so hard for him to describe them. But on analyzing what he is trying to say, it is found that he has

three very marked symptoms: *loss of "pep"*, or weakness; *loss of appetite*, or a distaste for food; and *loss of weight*. If these three symptoms are borne in mind they will be found very useful in following up the case, until a definite conclusion is arrived at as to the underlying pathology. Sometimes the patient will camouflage these under the name of "indigestion", but I don't know, and I am sure you don't know, how to describe the pathology of indigestion. It is important, therefore, to find out what he means by his statement that he has some "indigestion". He may mean that he has a little discomfort behind the sternum; he may mean that he has eructations of gas. These patients often complain, too, of a "torpid liver." If so, it is certain that either he or some of his friends, who have advised him, have been reading quack literature or dealing with osteopaths and chiropractors. "Torpid liver" is a great money-maker!

When all possible has been gleaned from the history, it is time to examine the patient. Occasionally on inspection a lump will be seen, or possibly a visible peristalsis, commonly a scalloped abdomen. The lump may or may not be felt on palpation. If it is a pretty big lump and is located in the stomach, the chances are that the man is beyond hope. After palpating for a moment or two, on looking again, a visible peristalsis may be seen to take place from the stirring up of the muscle wall. Sometimes, however, the stomach has become so atonic from over-distention that peristalsis is not present. There may be tenderness if the growth is close to, or in contact with, the parietal peritoneum, and there may be hyperæsthesia for the same reason.

The stomach contents are examined for hydrochloric acid. As a rule this is diminished or absent in cancer. I have on one or two occasions seen it increased. Then, one may look for the Boas-Oppler bacillus, and more particularly for fragments of tissue that may be brought up by a stomach tube.

Then it is about time to call in the services of the x-ray, but it is only a waste of the patient's money as well as of one's own time and temper to have this done by anyone but an expert. I see a great many cases that are sent as cancer of the stomach because the x-ray said so. When the patients bring their films, I find the x-ray does not say so, but the man who tried to interpret the x-ray did.

Don't ever wait for pain as a symptom, because it is one of the latest symptoms, the reason for which I have mentioned—the lack of sensory nerves in the stomach wall.

Having made a diagnosis, one must take the patient into his confidence and be absolutely frank. Most people will face a grave situation bravely; otherwise they have to face death.

Having made a diagnosis of cancer, probably operable, is the patient to be sent to the hospital to-day to have operation to-morrow? I hope not, because the man is already dehydrated, he is starved, and he is anæmic, and, besides, in all of these cases there is an unknown quantity, it may be a combination of all three that I have mentioned, but it may mean death if one is not very careful of his pre-operative treatment. The dehydration and starvation can be overcome to a very large extent by the intravenous administration of 5 to 10 per cent glucose in normal salt-solution, and if the dehydration is fairly great, one need have little or no hesitation in having it go in continuously for four, five, or six days, when the patient begins to think he is just about cured because he feels so much better. The anæmia is overcome by one or more blood transfusions from suitable donors, and these precautions will help to overcome the uncertain quantity that I cannot interpret.

To avoid shock as far as possible during the progress of the operation, I am strongly in favour of small doses of spinal anæsthetic, unless of course the blood pressure is low, when it is safer to use gas and oxygen, associated with local and splanchnic anæsthesia.

There has been a great improvement in the diagnosis of cancer of the stomach since the advent of the x-ray. For instance, I have been looking up some of my early cases, and in the five-year period from 1907-1911 there was not a single case referred in which it was possible to do a resection; they were waiting for the text-book symptoms of cancer of the stomach, and as a rule the text-book signs and symptoms of carcinoma of the stomach really are the signs and symptoms of an approaching autopsy!

From 1912-1916 it was possible to resect in 17 per cent of the cases seen, and from 1917-1921 we were able to resect in 33 per cent. From 1922-1926 resection was possible in a

little over 50 per cent; in the five-year period, 1927-1931, it was 47 per cent. During the period, 1922-1926, a study of how post-operative mortality was reduced gave us a record of 13.5 per cent. Therefore, in discussing the state of affairs with the patient who is unfortunate enough to have cancer of the stomach, one can assure him that he has a possibility of lengthening his life, or even of bringing about a cure by operation, with the risk of dying, as a direct result of the operation or some complication, in 13.5 per cent of the cases; whereas without operation the patient has to face 100 per cent mortality, and his death is brought about by slow starvation with its associated misery. In my experience the patient will accept the possibility of that 13.5 per cent as against a certain 100 per cent.

During the progress of convalescence there is a tremendous lot in the psychology of the treatment of these people. Of course one must be careful of the diet, but at the same time one must be optimistic and encourage the patient if one's conscience will permit. For instance, I had this experience a few years ago. An old man of 71, a farmer, arrived, and he had more than half of the stomach involved. I told him the situation and he said, "Well, I think I'll take a chance." I took out about three-quarters of his stomach and he did very well except that, while he would take everything we offered him in the way of nourishment, when it came to about ten days after his operation, I said to him, "What's the matter with you? Why don't you eat?" "Oh," he said, "those girls don't know how to cook." He had been living for fifty years with the same cook, his wife. I telephoned down to the doctor where he lived and asked him if he could send the old chap's wife up. The old lady arrived and I told her what I wanted. She was to sit with him for a while in the mornings. Then the nurses would wheel her out in a chair and they would prepare his meals just as they had been doing. When they were ready I had her take them in and feed her husband. Inside of twenty-four hours that old chap would have eaten "the plaster off the wall" if his wife had handed it to him!

Case Reports

A CASE OF STAPHYLOCOCCUS AUREUS PYÆMIA WITH OSTEOMYELITIS TREATED WITH GENTIAN VIOLET

BY MERRELL L. STOUT, B.A., M.D.,

Royal Victoria Hospital

Montreal

The following case report is of interest because of the extraordinary rapidity with which the bone lesions progressed, and the rapid and complete recovery.

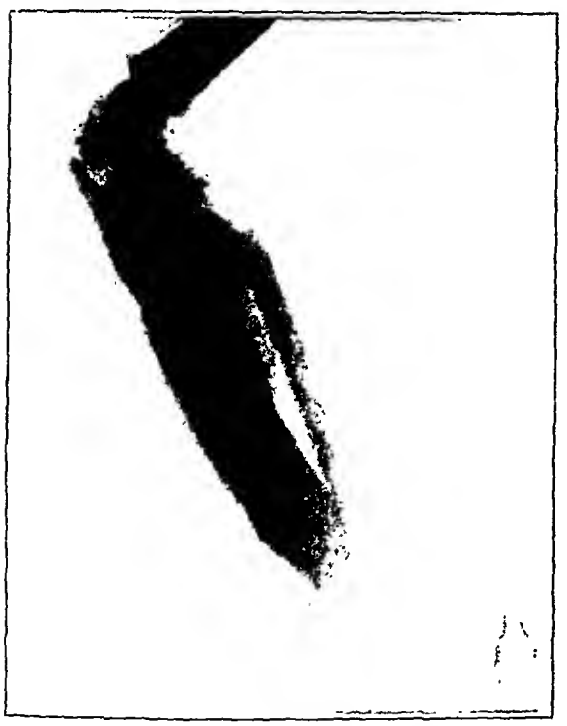
Baby N. L., aged three weeks, was admitted to the Pædiatric Service of the Royal Victoria Hospital, Montreal, on January 29th, 1932. The mother said that the child was restless, feverish and sleepless, and that these symptoms had been present only during the three previous days. The family history was irrelevant. The patient was the first born, delivered spontaneously at term after a short and easy labour. The mother was told that the child was quite normal at birth.

On admission, the temperature was 101.4°F. by rectum, and the physical examination was negative except for the presence of some reddening and inflammation around the umbilicus. Cultures taken from this area revealed the presence of *Staphylococcus aureus*. Urinalysis showed no albumin, no sugar, and no pus or blood. The leucocyte count was 20,000, blood sugar, 0.09 mgrm. per cent and the blood Wassermann test negative.

On January 30th a fluctuating mass, about 3 cm. in diameter, was noted on the left side of the chest at the level of the sixth rib in the anterior axillary line. Incision and drainage was performed and the abscess seemed to be superficial to the ribs. A moderate amount of thick, creamy, yellow pus was discharged. During the next few days the temperature varied from 101-103°F, and the leucocyte count from 20,000-30,000. Abscesses developed in the following order; on the scalp, right cheek superficial to the parotid, both knees and right elbow. These were all opened and drained, cultures taken from all of them

showing the presence of the same organism, *Staph. aureus*. Three days after admission the umbilical infection had healed without local treatment other than the application of clean dry dressings.

On February 6th, eight days after admission, the left leg became diffusely swollen, but no definite fluctuation could be demonstrated. An x-ray taken at this time revealed osteomyelitis involving the lower end of the left femur and the whole of the left tibia. A large sequestrum and a good deal of new bone-formation was to be seen. (See skiagram below) Two days later the left elbow-joint became acutely inflamed and fluctuating. Incision and drainage revealed a



pyarthrosis with *Staph. aureus* in culture. The x-ray findings were as above, showing osteomyelitis of the humerus and ulna. It was decided that the bone lesions did not require immediate operation and that the sequestrum could be more safely removed at a later date.

On February 7th, nine days after admission, a blood culture was found to be strongly positive—containing approximately 90 colonies of *Staph. aureus* per c.c. of blood, and it was thought wise to attempt treatment by means of gentian violet given intravenously. This was done according to the method described by N. Stanley-Brown in the *Surgical Clinics of North America* for 1928. Twenty milligrams of the dye were injected into the internal jugular vein—five milligrams of dye per kilogram of body weight being taken as the basis of dosage. It was given in the form of a 0.5 per cent solution in normal saline, the total amount of fluid injected being 4 c.c. The next day 5 c.c. were given intramuscularly into the buttocks. As this small dose was quickly absorbed and did not seem to cause any irritation, a larger dose was soon given, 20 c.c. of a one per cent solution. This also was rapidly absorbed without any evidence of irritation. The first voiding after each injection showed a slight purple staining of the diaper, otherwise the urine remained perfectly clear. Also all of the draining abscesses were repeatedly irrigated with 0.5 per cent gentian violet solution. Within twenty-four hours the temperature had begun to fall.

By February 15th, a week after the first dose of gentian violet the temperature had returned to normal, the abscesses began to heal, and the child started to gain weight and to take its feedings much more eagerly. A second blood culture taken at this time revealed only one colony in all the media inoculated. This colony, upon being replanted, was noted to ferment the lactose broth much more slowly than the organisms obtained earlier in the illness.

When the child was discharged four weeks after admission it was found to be quite healthy and the abscesses were all healed. Six weeks after admission when seen in the Pædiatric Outdoor Department, March 18th, 1932, the child was reported as being quite well

DISCUSSION

The above case would seem to demonstrate that gentian violet has a definite antagonistic effect upon *Staph. aureus* in the human organism, at the same time being non-irritating and non-toxic to the patient. It is suggested that the intramuscular route is a satisfactory one for the administration of the drug, as it appears to be absorbed rapidly and without local or general irritative effects upon the body when given in this manner.

Attention should be drawn to the fact that the bone lesions were grossly visible in x-ray plates taken within ten days after the onset of the original umbilical infection.

My thanks are due to Dr. H. P. Wright and Dr. Graham Ross for their aid and advice in preparing this report.

CHANGES IN BONE SARCOMA AFTER INTRAVENOUS INJECTIONS OF A COLLOIDAL SOLUTION OF METALLIC ARSENIC

BY ARTHUR C. HENDRICK, M.A., M.B., F.R.C.S. (EDIN.) AND PROF. E. F. BURTON, B.A., PH.D.,

University of Toronto,

Toronto

Bone sarcoma is the most frequent of the primary malignant tumours of bone, and is said to account for 30 per cent. of all sarcomata. In its pathological aspects bone sarcoma is a subject of much complexity, but its clinical course and termination are only too uniform, as with hardly any exceptions its malignancy is most characteristic, for, even after the earliest radical treatment, a fatal termination is not long delayed.

Bone sarcoma usually commences in or near that part of the bone in which proliferative changes normally progress most actively, namely, the metaphysis, that region of cancellous bone immediately on the diaphysial side of the epiphysial cartilage (cartilage of conjugation).

Classifications of bone sarcoma are much confused and very perplexing to the surgeon, although, perhaps, with a wider knowledge of the work of Leriche and Policard, as advocated by Greig, of Edinburgh, the matter may be cleared up.

The case here reported seems to be a typical example involving a long bone, *viz.*, the femur.

The patient was a married female, aged twenty-two years. She first came under the observation of Dr. G. E. Richards, Director of the Department of Radiology, Toronto General Hospital, and we are greatly indebted to him and his Department for their cooperation in

FIG. 1.—No. 240,192. Mrs. R. F., November 14, 1930.

This is an antero-posterior film of the lower end of the femur showing a destructive lesion apparently originating in the medulla and extending throughout the lower six inches of the bone. There is marked rarefaction and destruction in the medulla and this extends through the cortex at numerous points both on the inner and outer aspects of the bone. At this time high-voltage x-ray therapy was commenced. 200,000 K.V.P. 0.5 mm. copper, 1 mm. aluminum; distance 55 cm. Four portals of entry, saturation of the tumour with moderate erythemas in the skin.

FIG. 2.—No. 250,094. Mrs. R. F., June 19, 1931.

The process shows marked extension. The areas of destruction in the lower end of the shaft have increased and a pathological fracture has occurred immediately above the condyles. On the inner side the cortex has been ruptured through and marked destruction has occurred throughout the inner condyle on this side. The mass in the soft tissues is much larger and is more clearly defined, and is to be clearly seen in the accompanying print. The "sun-ray" effect is more defined and the striations are much coarser and more clearly visible. At this time it was felt that x-ray treatment was not controlling the growth and the patient was referred for colloid treatment.

the preparation of the report of this case and of radiographic films.

In November, 1930, the patient was first seen by Dr. Richards, and at that time the growth was extending widely along the paths of least resistance, permeating the interstices of the bone and eroding the lamellæ. It had extended along the medullary cavity for a distance of six inches and was also permeating the cortex and erupting on the surface into the soft tissues. At this time high-voltage x-ray therapy was commenced and continued at intervals until June, 1931, when radiographic films were again taken. It was then found that the disease had progressed markedly and that a pathological fracture had occurred. It was felt, therefore, that the high-voltage x-ray therapy was not controlling the growth and the patient was referred for colloidal treatment.

On July 2, 1931, intravenous treatment was commenced and the deep x-ray therapy discontinued. The solution used was a colloidal solution of metallic (elemental) arsenic, originated by Prof. Burton, and was given intravenously three times a week in doses of from 0.5 c.c. to 0.8 c.c.

On October 9, 1931, radiograms were again taken and it was found, among other things, that the pathological fracture noted in the June films had united. This was following three months' treatment with the colloidal solution.

Again on January 27, 1932, after somewhat more than six months' treatment, another set of films was made, Dr. Richards' report showed further progress. The healing of the fracture had become firmly consolidated. The areas of destruction in the lower end of the femur appeared to be diminishing in size, and the

FIG. 3.—No. 23,657. Mrs. R. F., October 9, 1931.

The patient has been receiving the colloid since June. In these films it is seen that the pathological fracture has united. The cortical portion of the inner condyle is much increased in density and several bony bridges are present. Throughout the area of destruction in the lower end of the femur the calcium content is much denser than at the previous examination. The soft tissue tumour anteriorly is sharply defined and throughout it striations are present which are becoming heavily calcified. Posteriorly, areas of calcification are occurring especially at the extreme upper and extreme lower edges of the soft tissue mass.

FIG. 4.—No. 25,147. Mrs. R. F., January 27, 1932.

The healing of the pathological fracture has become firmly consolidated. The areas of destruction in the lower end of the femur appear to be diminishing in size and the general appearance indicates quite definite increase in calcium content throughout the whole involved section of the bone. Anteriorly the soft tissue tumour shows very marked increase in calcification, is sharply delimited, and in its upper and middle portion is quite heavily calcified. Posteriorly the soft tissue mass has disappeared, leaving spicules of new bone-formation at the extreme upper and extreme lower points of its original attachment to the shaft of the femur. The entire appearance is considered quite characteristic of a lesion which is healing by calcification.

general appearance indicated quite definite increase in calcium content throughout the whole involved section of the bone.

At the present time the patient is in good health, free from pain, and is carrying on her usual household duties. Films were taken of the patient's lungs on November 15, 1932, and these show the lungs entirely free from metastases.

In a previous article* four cases of bone tumours treated with the colloidal solution were reported, and of these patient 1 and patient 4 are living. Patient 1 has been a student at a university during the last year.

Through the cooperation of Dr. Richards, who is responsible for the preparation of plates and the various reports, and who has given the most valuable assistance at all times, this case report was made possible and we wish to offer to him our sincere thanks.

* *Canad. M. Ass. J.*, 1931, 24: 642.

PERFORATED DUODENAL ULCER IN A TYPHOID CARRIER*

BY ERNEST J. CLIFFORD, M.B.,

Toronto

Perforation of a duodenal ulcer in a person already a typhoid carrier is an occurrence which has not been hitherto recorded, as far as I am able to discover. The patient in which this occurred had typhoid fever sixteen years prior to the date when he presented himself at the Toronto General Hospital for treatment, and all the other members of his family suffered with the same infection at the same time. During the intervening years he has had good health and worked continually at his trade as a plumber. There is no evidence that he was ever responsible for any case of typhoid fever during these years.

At the time of his admission to the hospital he was 55 years of age, and for the last two years had had moderate epigastric pain occurring two hours after taking food. The pain was relieved by alkalies. For a few days before the acute onset he had black stools but no hæmatemesis. Six hours before he was brought into the hospital he was seized with very severe pain, commencing in the left upper portion of the thorax, radiating down to the epigastrium and to the right side of the abdomen. He also had some pain of a lesser character in the left shoulder.

On examination a hard, board-like rigidity of the abdominal wall was found; his liver dullness was diminished; no free fluid could be demonstrated in the peritoneal cavity; and his general condition was one of moderate shock, with a pulse rate of 110, respiration rate 35, and blood pressure 130/85. A diagnosis of perforated duodenal ulcer was made and an immediate operation was performed. At the operation an ulcer, which had perforated into the general peritoneal cavity, was found on the anterior wall of the descending portion of the duodenum. The perforation was closed and, although badly shocked, the patient made an uninterrupted recovery.

Material for culture, taken from the fluid in the peritoneal cavity, was received at the laboratory. *B. typhosus* was found to be the only microorganism present. During convalescence, the fæces, plated on Endo agar, also permitted the isolation of the same organism, and agglutinins for *B. typhosus* were demonstrated in the patient's blood serum at this time in dilutions up to 1 in 160. Nine months later an examination of the stools revealed the same bacillus and eleven months later, when completely recovered, the patient, at my request, came to the laboratory where a tube was passed, and a culture made from the duodenal contents, from which *B. typhosus* was again isolated. Examination of the gall bladder by x-rays, during his convalescence, failed to show sufficient evidence to suggest disease of this organ.

The history of this case presents a number of features of considerable interest. It is, I believe, the first occasion in which *B. typhosus* has been found in the peritoneal contents following perforation of a duodenal ulcer. The subsequent finding of the organisms in the intestinal tract after eleven months, along with the history of typhoid fever 16 years before, proved the patient to be a chronic typhoid carrier. The presence of the organisms in the peritoneal cavity, as demonstrated at operation, and in the duodenum, suggests that in this case the residual focus of the typhoid bacillus would appear to have been in some portion of the biliary tract, probably the gall bladder. The facility with which typhoid bacilli could be obtained from the aspirated duodenal contents suggests that if this method of securing cultures were used a larger percentage of typhoid carriers would undoubtedly be detected.

The problem of the typhoid carrier is one of great interest at this stage in our knowledge of

*From the Department of Pathology and Bacteriology in the University of Toronto.

the epidemiology of typhoid fever. With proper methods of sewage disposal, filtration and chlorination of water supplies, and the pasteurization of milk, typhoid fever from these sources is becoming a lesser factor in our morbidity and mortality statistics. The carrier in this disease still remains the most pressing problem for solution. Satisfactory methods of ridding the individual of his potentially dangerous bacteria have not been found. At the present time the detection and registration of carriers, with subsequent control of their activities to prevent the possibility of their excreta coming into contact with the food material of other persons, are the chief methods relied upon to prevent infection from these persons, since mass vaccination, cholecystectomy and other procedures are rarely of practical value.

I wish to thank the Departments of Surgery and Radiology in the University of Toronto for kind permission to use their records in the presentation of the details of this case.

A CASE OF RE-ESTABLISHED PNEUMOTHORAX

BY L. M. MULLEN, M.D.,

Central Alberta Sanatorium,

Calgary

It is commonly believed that when pneumothorax is discontinued the pleural surfaces become adherent. This is probably true in the majority of cases. However, a number of instances have been reported where pneumothorax has been successfully re-established after the lung has completely expanded. Such an instance has been recently reported by Rubin,[1] who also gives in his paper a brief review of previous reports. The following is a report of a case in which pneumothorax, discontinued more than five years previously, was successfully re-established.

CASE REPORT

Miss C. M., aged 21, was admitted to the Saskatoon Sanatorium on October, 1925, complaining of cough with expectoration and pain in the lower right chest. The disease was of about a year's duration and was insidious in onset.

On admission, there were about 15 c.c. of mucopurulent sputum containing many tubercle bacilli. Physical examination showed crepitations on the right from the apex to the second costal interspace anteriorly, and the apex to the 5th vertebral spine posteriorly; on the left crepitations were present from the apex to the 2nd costal interspace anteriorly, and from the apex to the angle of the scapula posteriorly. Roentgenograms showed involvement of the right lung from apex to base, with cavitation below the clavicle; the left lung showed involvement in the upper half.

Right pneumothorax was induced on Dec. 7, 1925, and a satisfactory collapse obtained. The greatest amount of collapse was over the right upper lobe where cavitation was present. The sputum was repeatedly negative except at the examination on admission. Pneumothorax was discontinued on Nov. 9, 1926, and the lung expanded fairly rapidly. No fluid was detected at any time. On re-expansion the cavity had apparently closed. The left lung also appeared clearer. The patient was discharged on July, 1928. At this time right-sided signs had increased in a downward direction posteriorly, and there was also an increase in signs on the left anteriorly. An x-ray showed clearing in the upper half of both sides and new disease below each hilus. There was no sign of any pneumothorax. After discharge the general condition of the patient apparently improved. She felt well and lived a moderately active life.

In May, 1931, she became suddenly ill with fever, headache, and tightness in chest. She was in bed five weeks, then became ambulant. In August, 1931, hæmoptysis occurred, with bloody sputum for ten days following; absolute bed-rest followed until admission here. She was admitted to the Central Alberta Sanatorium on Oct. 13, 1931, complaining of cough, mucopurulent sputum (120 c.c. in 24 hours) loss of weight, loss of strength, flushes, and pain in the chest.

Physical examination showed slight dullness and medium coarse râles from the apex to the base, both anteriorly and posteriorly on the right; on the left crepitations were present from the apex to the third costal interspace and from the apex to the 5th vertebral spine. The right side lagged on inspiration and the breath sounds were suppressed.

The roentgenographic reading was as follows.

"Bony thorax regular. Right side: There is apparently a fibrous band extending from the hilus to the lateral wall in the region of the 1st rib, where there is some pleural thickening; from the 7th to the 10th rib posteriorly in the paravertebral region there apparently is a thick-walled cavity; the right base shows a degree of

mottling; the diaphragm was not distinctly seen. Left side: Small fibrous fan extending into the apex and a degree of fibrosis lateral to the hilus; diaphragm regular; lateral sinus clear. The heart is drawn a little to the right. There is a right basal lesion with a large cavity and a thickened pleura; a small amount of disease of the left lung. The condition is far advanced, due to large cavity."

The patient was given absolute bed-treatment. The sputum decreased to 60 c.c. but was persistently positive for tubercle bacilli. There was slight loss in weight. Pneumothorax was attempted on March 23, 1932, and a satisfactory collapse obtained. The greatest collapse was found by x-ray to be at the base and the cavity was closed. Sputum was quickly reduced to about 8 c.c. and was negative for tubercle bacilli.

It is interesting to note that pneumothorax was successfully re-established in spite of some roentgenographic evidence of a thickened pleura, and that both the primary and re-established pneumothoraces were at least to some extent selective. In each instance the greatest collapse was near the area of cavitation—in the primary below the clavicle, in the re-established, at the base.

I am very much indebted to Dr. H. C. Boughton, Medical Superintendent of the Saskatoon Sanatorium, for information regarding the patient while under his care.

REFERENCE

1. RUBIN, *Am. Rev. Tuber.*, 1932, 4: 490.

Editorial

LEAD-POISONING IN CHILDREN

ON page 207 of this issue will be found an account of a symposium on lead-poisoning in infants and young children, based upon a study of sixteen cases of this affection admitted to the Children's Memorial Hospital, Montreal, during 1932. This account crystallizes in a convenient form the information obtained by a very scientific and thorough investigation, and will, it is hoped, direct attention to a particular malady in those of tender age which is apt to be overlooked. The practical importance of the subject is indeed great. So far as we can ascertain this is the first time that any fair number of cases has been reported on in Canada, and, while lead-poisoning in children has attracted some attention of recent years in Australia[1,2,3,4] and the United States,[5] one is struck with the paucity of references to the subject in the literature.

There are many sources and many ways by which lead may enter the body, and these are so well recognized that there is no need to recapitulate them here. Moreover, since the introduction of more delicate chemical tests, it has become apparent that most people are habitually absorbing small amounts of lead without anyone being the wiser, which fact raises the important question how far chronic cardiac, arterial and renal disease of late life is dependent on this factor. It does not seem, however, that any of the very varied signs and symptoms that we associate with the term "lead-poisoning" are becoming more prevalent. While from the nature of the case we would expect lead-poisoning to be more common among the adult population, and this, of course, is the case, it is becoming clear that young children and even infants are not exempt from it, and now that attention has been called to the matter it may prove that the affection is more common among them than has been suspected. Rarely, poisoning with lead has been due to the ingestion of some medicinal preparation containing lead. Thus, one case has been recorded in a nursing infant, whose mother had been using a lead lotion for a sore breast. In view of the well-known fact, however, that small children are prone to put articles into their mouths or bite upon them, we are not surprised to learn that most of the cases of lead-poisoning in children can be related to toys or cribs that have been painted with lead-containing paints. An interesting variant of this has been met with in Queensland (Gibson[1]). In that country many of the

1. GIBSON, *Australasian Med. Gaz.*, April 20, 1904, 149.
2. CROLL, *Med. J. of Australia*, 1929, 2: 144.
3. NYE, *Med. J. of Australia*, 1929, 2: 145.
4. GIBSON, *Med. J. of Australia*, 1930, 1: 327.
5. U. S. Bureau of Health, Rep. H 29, (Ref. in *J. of State Med.*, 1931, 39: 302).

houses are provided with high verandahs which are usually painted with lead paint. During the heat of summer, particularly, when the children are put out on these verandahs to play, the paint becomes flaked or dessicated and is licked off, either as a powder or suspended in raindrops. Gibson traced a number of cases, characterized by the typical features of colic, wrist-drop, neuroretinitis, and ocular paralyses, to this source. In the Montreal cases the poisoning was traced to toys painted with yellow paint (lead chromate), the white paints tested being, apparently, free from lead.

The diagnosis of lead-poisoning in children depends upon the same considerations, in the main, that pertain in adults—a variable array of nervous phenomena, gastro-intestinal disturbances, weakness, anæmia, the lead line in the gums, punctate basophilia of the red blood cells, and an excess quantity of lead in the urine and fæces. There is this valuable difference, however, that in children x-ray examination will show an increased density of the growing ends of the long bones and the costo-chondral junctions. On this point alone lead-poisoning will sometimes be diagnosed by the radiologist before the clinician has even suspected the true state of affairs. While this sign has been noted in connection with rickets and cretinism and in children who have been taking bismuth or phosphorus a carefully-taken history and a proper physical examination will prevent error.

We may properly enquire at this point whether the clinical features of lead-poisoning in infants and children differ in any important respects from those found in adults. Unfortunately, since so few cases of lead-poisoning in the very young have been recorded, it is hardly possible to do more than record impressions. Nye states that in a series of 38 cases of chronic nephritis, where a history was obtained, 14 children had been treated previously for lead-poisoning, which etiological factor was more than twice as common as any of the more ordinary causes, such as infections. He notes that in the hospital cases the onset was usually sudden, with gastro-intestinal disturbance, such as vomiting and constipation, but colic was not a regular feature. Headache was present in many cases, sometimes with retraction of the head. Other cerebral manifestations, such as choreiform movements, convulsions, and coma were not common. The majority of the young patients sought aid because of weakness and pains in the legs and arms. In Queensland paralysis of the legs was more frequent than paralysis of the arms. It should be noted, however, that the 12 cases reported in detail by Nye ranged as to age from four to nineteen years. No infants are reported upon. The study of the Montreal cases supports the view that lead-poisoning is the more acute, the younger the child, and that in infants it is apt to take a cerebral form. The two fatal cases died with convulsions. As children get older lead-poisoning is more apt to conform to the commoner adult types, with weakness, anæmia, and various muscular paralyses. In Nye's cases one, aged four years, had foot- and wrist-drop, and two others, aged five and seven years, had foot-drop. Ocular signs, paralyses and neuroretinitis, noted by Gibson,[4] were not common in the Montreal cases.

The occurrence of the severer cerebral manifestations of lead-poisoning in infants explains why it is that the cases are diagnosed usually as meningitis, acute tuberculosis, brain-tumour, or simple "convulsions." Colic, not so frequent, however, with fever and leucocytosis, will suggest appendicitis; colic with constipation will suggest intestinal obstruction; the rapid onset of paralyses will suggest acute anterior poliomyelitis. In all such cases careful investigation of the history and the various points mentioned above should make diagnosis easy. The most important thing is that the physician should always have in mind the possibility of lead-poisoning in children who manifest weakness, anæmia, and convulsions, particularly if there is any muscular paralysis as well. Nor should he be content with a diagnosis of meningitis, encephalitis, or "convulsions" until he has investigated the case fully.

Correct diagnosis is of great importance, not only because in the acute cases there is immediate danger to life, but because unrecognized or neglected cases become associated with serious sequelæ. Nye,[3] in a study of chronic nephritis in young people, which was extraordinarily prevalent in Queensland in 1929, was able to link up 14 out of a total

of 80 cases definitely with previous lead-poisoning, and has no doubt as to the etiological importance of swallowing lead paint in childhood. He finds that in these cases chronic nephritis begins insidiously in late adolescence, develops into definite cardio-vascular-renal disease, and ends fatally from uræmia about ten years later. He points also to the appalling fact that in all these children with lead-poisoning renal-function tests show that renal insufficiency was already well-established. The moral, then, is obvious.

A.G.N.

THE REPORT OF THE COMMITTEE ON THE COST OF MEDICAL CARE

THE Committee on the Cost of Medical Care has laboured and brought forth a report of extraordinary interest and authority, that marks the culmination of a five-year survey and an intensive study of the organization and cost of medical services.

The regrettable, but not surprising, feature of the report is that it is not unanimous, and that a wide divergence of viewpoint exists between the main body of the Committee representing institutions, social interests, public health, social sciences and the public, and a minority group representing, practically, the American Medical Association. The majority report is signed by seventeen of the twenty-five physicians on the Committee, and by thirty-five of its total membership of forty-eight. Of the group of nine who approve the minority report, eight are physicians.

The Committee was established under the auspices, and with the financial backing to the extent of almost a million dollars, of several of the great educational and eleemosynary institutions of the United States, including the Rockefeller and the Carnegie Foundations and the Julius Rosenwald and Milbank Memorial Funds. The premise on which the Committee carried out its study was that a vast amount of unnecessary sickness exists and thousands of preventable deaths take place, and that, though the medical profession has made enormous advances in knowledge and institutional resources, many people are not getting the service they need because the cost is often beyond their means and in many parts of the country is not available.

It may be assumed that conditions relating to the practice of medicine in Canada are analogous to those prevailing in the United States, and that the facts, figures and conclusions represented by the Committee are applicable to the Dominion. Canadian physicians should therefore study with particular care the recommendations made, some of which are certain to arouse wide differences of opinion and heated argument among medical men because of their radical character. The recommendations are based on twenty-six reports on fact-finding studies, made by trained investigators, and many contributions by collaborating agencies.

The main features of the majority report are:—

1. That medical services of all kinds, with the exception of those generally recognized as coming within the province of governments or communities, should be furnished largely by organized groups.

2. That all basic public-health services should be available for the entire population according to its needs.

3. That costs should be placed upon a group-payment basis, through the use of insurance or taxation.

The dissenting minority group maintain that "Centuries of progress in the conquest of disease give us confidence that the individual and not the group should remain the unit of practice in medicine."

The *Journal of the American Medical Association* opens a vigorous attack against the group-practice plan, by characterizing it as medical care by "Medical Soviets," and "Incitement to Revolution," and strongly supports the minority recommendations that "The corporate practice of medicine, financed through intermediary agencies, be vigorously and persistently opposed as being economically wasteful, inimical to a continued and high quality of medical care, and an unfair exploitation of the medical profession."

The views of the Committee on providing medical care for indigents are interesting and timely, both majority and minority

reports stressing the responsibility of the public to supply and pay for medical services for this class by distributing the cost over the rest of the community, according to ability to pay.

A dissenting statement is included in the report by a Professor of Law in Yale University, who maintains that, though forward-looking and constructive, it "falls short of an adequate attack on the problem of medical care." He asserts that if medicine is to uphold its high and unselfish traditions of service in an industrial world dominated by business the acquisitive motive must be eliminated from practice by keeping physicians and patients out of business, that compulsory health insurance is the very minimum the Committee should have recommended, and that the venerable principle of medicine, "To each according to his needs, from each according to his ability to pay," should be adapted to meet modern conditions.

The foregoing are a few of the salient features of the report. That the recommendations of the majority group will be accepted as of immediate applicability by any considerable number of physicians engaged in private practice is doubtful, but one may not be far astray in predicting that, in the light of present day dissatisfactions and developments, the medicine of the future will increasingly follow the group-payment and service plan suggested. The wide-spread interest manifested by the medical profession and the public in medical organization and economics, as evidenced by a deluge of books, reports and newspaper articles on these subjects, suggests that ground may exist for the criticisms that prevail so widely of the system under which medical services are offered and paid for at the present time, and that a reappraisal of the principles relating thereto might well be undertaken by organized medicine.

The majority report of the Committee on the Cost of Medical Care, endorsed by such a large proportion of its members, including many able and judicially-minded students of social and economic conditions, together with the ever increasing control of medical service by governments, municipalities and charitable and business organizations, indicates that medicine is slowly but surely losing direction of its economic destiny. The reason is not far to seek. The physician, preoccupied with the burden of practice, has little time to devote to the complicated problems of medical organization and economics. Even in the field of medical licensure and education, over which medicine has statutory control, his representatives have done practically nothing to ensure high standards of specialization and to protect the public from ill-qualified practitioners. Is it surprising, therefore, that, to cite but one example, Compensation Boards are commencing to look not unfavourably upon the selected panel system as an assured method of limiting periods of disability in accidents, through provision of the best medical skill obtainable, or that the report of the Washington Committee recommends important departures from the time-honoured method under which medical care has been supplied in the past?

The failure of the Committee to reach unanimous conclusions may prove a blessing in disguise, as it will result in wide discussion and the consequent clarification of issues that are vital and difficult to solve. One thing, however, seems certain, that, unless medicine meets the challenge of the times, governments, communities, and profit-seeking organizations will obtain the business direction and control of practice, and the will of the self-seeking politician and the social-service visionary will prevail, which will not be "a consummation devoutly to be wish'd." But, even though the recommendations of the Committee may be received with disapproval or active hostility by many physicians, the twenty-six published surveys and studies upon which the report is based should prove to be a mine of information and of great educational value to the medical profession and of material assistance in solving the problems of medical economics and organization that are such a vital issue in the world today.

W. HARVEY SMITH.

Editorial Comments

Should Doctors Pay for Hospital Privileges?

At a recent provincial hospital association convention the suggestion was made in all seriousness that the hospitals should ask the doctors to pay for the privilege of taking their private patients to the hospital. It was pointed out that hospitals were founded primarily for the sick poor, not for private patients; that the facilities supplied by the hospital have lessened immeasurably the hardships of practice; that doctors book private accommodation without obtaining any assurance that the patient will pay the hospital. This suggestion recalls to mind the proposal made by an old established hospital in the same province that doctors be asked to guarantee the hospital accounts of their own private patients.

Undoubtedly, hospitals are mulcted all too often by patients who, under one pretext or another, avoid paying the hospital account; undoubtedly, doctors would be sorely handicapped were they not able to utilize the facilities of the hospital; undoubtedly, some doctors might take greater pains to ensure that their patients book only that accommodation which they can pay for. All this may be true, but it is a matter of regret that hospital boards and the community at large do not more fully appreciate the fact that the profession as a whole pays back a hundredfold in free services any incidental advantages which may be reaped by them as individuals.

It does not seem to be realized by some Board members that requests for new equipment or instruments result in benefit primarily and directly to the citizens themselves, and, to a far less degree, if at all, to the medical profession. Moreover, by taking a patient to hospital the doctor robs himself of his mileage tariff and, where funds are limited, often realizes that by so doing all of the meagre savings will go towards meeting the hospital bill, leaving nothing for himself or his colleagues. It may not seem like a large contribution to look after indigent patients free of charge, to care for sick nurses, to prepare and deliver lectures to the training school, to look after out-patients, or to attend to the many demands of the hospital upon a doctor's skill, energy and time, but when these tasks are added to the multitudinous unpaid services of his extra-hospital practice, the sum total of his contributions to the community welfare is almost beyond credence.

Apparently doctors are not good self-advertisers. While experience has proved the wisdom of deprecating self-advertisement of the individual, surely our ethical standards do not prevent the profession as a whole asking for more general recognition of the value of their ever-increasing non-remunerative services. There are not many hospitals still requiring doctors to supply their own instruments or their own gowns and gloves, but in almost every building campaign, the cry is raised by more than one person, "Why should we contribute? The doctors are the ones who benefit." Perhaps the doctors leave themselves open to criticism and reproach by keeping their light hidden under a bushel and by not participating sufficiently in hospital activities. On the morning when the suggestion mentioned above was raised before the hospital convention there was but one *practising* physician in the entire audience! Fortunately, the great majority of our boards of trustees, our superintendents and our medical staffs are cooperating most harmoniously, and the situation is improving every year, but the frequency with which questions concerning medical privileges are raised in our hospital conventions, and the apparent indifference of the medical staffs towards the general problems of hospital activity, indicate the need for a much greater interest on the part of our doctors in the general welfare of our hospitals than is at present displayed.

HARVEY AGNEW

William Sydney Thayer

William Sydney Thayer, of Baltimore, died suddenly on December 10, 1932, of coronary artery disease. In him the profession loses a most eminent teacher and consultant, one whose intimate association with Osler gave him an interest in Canada and whose own work made him well known to Canadians.

Thayer was born at Milton, Mass., in 1864. With several generations of intellectual antecedents, he was a teacher by heredity as well as by training. Osler wove one of his whimsical legends around a learned ancestress of Thayer's who was always depicted "rocking the cradle with one hand while expounding Homer to her husband's pupils with the other." He was educated at Harvard, graduating A.B. in 1885 and M.D. in 1889, and, after an internship at the Massachusetts General Hospital, he joined Osler's staff as assistant resident physician in 1890 at the recently founded Johns Hopkins Hospital. The following year he succeeded Dr. Lafleur as resident physician, a post he held for seven years with intervals of study abroad. In 1898 he was appointed Associate

Professor of Medicine and Visiting Physician in charge of the out-patient department. Thereupon he became one of the "latch-keyers", Osler's next-door neighbours, who figure in Doctor Cushing's great biography. Ten years later he accepted the professorship of medicine on the full-time basis which earlier, for financial reasons, he had been obliged to refuse. Since 1921 he had been Emeritus Professor.

Thayer's war service was distinguished and was performed with the pen as well as the stethoscope. His poem "America—1917" is a noble expression of the pro-ally sentiment that was chafing at his country's protracted neutrality. In Russia with the Red Cross Commission during the worst chaos of the Bolshevist revolution, it is to be hoped that he has left a record of the adventures which the present writer heard him relate to the Oslers on his return. In France in 1918-19 as chief consultant to the American forces he earned the Distinguished Service Medal and the Officership of the Legion of Honour.

Thayer's chief published works are "The Malarial Fevers of Baltimore," 1895 (in collaboration with the lamented John Hewetson, of Montreal); "Lectures on malarial fever," 1897, and "Studies on bacterial endocarditis," 1925. His uncommon literary talents are manifested in two volumes of verse, and in his collected essays and addresses published in 1931 under the title, "Osler and other papers". The first of these which deal with his beloved Chief give us in brief the best of all character sketches of Osler; one is his address at the opening of the Osler Library, on which occasion the LL.D. of McGill University was conferred upon him.

A past-president of many associations, including that of the American Physicians and the American Medical, Thayer was an honorary member of an extraordinary number of British and Continental societies. Few American physicians have been so well known abroad. He was an accomplished linguist, speaking Russian in addition to the commoner languages, and having a masterly knowledge of French. In his younger days Paris was his annual Mecca; once, with only a fortnight's holiday, he managed to spend a few hours of it there.

The present Regius Professor at Oxford thus sums up a tribute to Thayer: "A refined, lovable, gentle spirit whose passing will grieve a host of friends in many lands." W. W. FRANCIS

The Late Dr. Frank Billings

One of the most conspicuous figures in American Medicine during the last fifty years was lost when Dr. Frank Billings died on September 20, 1932, at his home in Chicago. Doctor Billings was a great physician, a great teacher, and a great leader. Far-seeing, wise in counsel, energetic, he has left a lasting mark on his day and generation. Perhaps he will be best remembered for the pioneer work he did in bringing about the standardization of medical education in the United States.

Doctor Billings was born in Wisconsin on April 2, 1854. As a youth he worked on his father's farm and attended the local school and the state normal school. He then became a schoolmaster, and, turning to medicine, graduated from the Chicago Medical College in 1881. He acted as intern at the Cook County Hospital for a time and then took up practice in Chicago, in which he met with outstanding success. In 1885 Doctor Billings went to Europe for post-graduate study and remained there for fifteen months. He brought back with him the latest advances in medical science, particularly in laboratory technique. He was a teacher of physical diagnosis and medicine in the medical school of the Northwestern University from 1886 to 1891, and then became Associate Professor of Medicine in Rush Medical College and, later, Professor of Medicine and Dean of the faculty. One of the great results of his effort and powers of inspiration was the development of the Presbyterian Hospital as a model teaching centre. Such was the confidence that he inspired as a physician and philanthropist that he was often consulted in matters of great social import. Thus his advice resulted in the establishment of the John McCormick Institute for Infectious Diseases, a hospital in connection with this Institute, the Sprague Institute, the School for Medical Teaching in the University of Chicago, the Billings Memorial Hospital, the Billings Library, and many such-like activities.

From the earliest days of his long career Doctor Billings was devoted to the highest ideals of his profession and entered on a campaign for broader and better medical education, which was destined to bear good fruit. His address as President of the American Medical Association in 1903 resulted in the creation of the Council on Medical Education, which brought about the standardization of medical education in the United States. His address before the same Association in 1905 was a guide to the Council on Pharmacy which has done so much to enlighten the public on the matter of patent medicines. Major-General Merritte W. Ireland, M.D., said of him: "His is a shining example of devotion to duty, self-sacrifice—personal and financial—and a continued striving for higher ideals in medicine. . . The memory of no other teacher of medicine in this country is more blessed than his." A.G.N.

Revue Française de Chirurgie Réparatrice, Plastique et Esthétique

This is a new scientific journal sponsored by La Société Française de Chirurgie Réparatrice, Plastique et Esthétique. Its establishment is due to Doctor Dartigues, president and founder, and to Doctor Claoué, general-secretary of this Society. Among the collaborators will be found the names of many in France and elsewhere who are eminent in this special field of surgery. It is felt that the publication of this special journal will do much to advance the knowledge of this particular branch of surgery.

All who desire information on this matter should apply to Dr. Dartigues, 81, Rue de la Pompe, Paris, 16ème, France. A.G.N.

Men and Books

THE TRUTH ABOUT CERBERUS:

A STUDY OF PHYSIOLOGICAL MYTHOLOGY IN THE MANNER OF LUCIAN

BY W. B. HOWELL

Montreal

Machaon to Æsculapius, Greeting:—

You were right in your suspicions, my father. Cerberus is a humbug. The stories of his acting as guardian of the Infernal Regions are pure fable. But I must begin at the beginning and give you an account of my investigation. I found my way with no great difficulty to the shore of the river Acheron, and, having presented my pass to Charon, was allowed to embark in his ferry boat. This gentleman, I may tell you, is thoroughly up-to-date in the management of his transportation business. Such overcrowding! Such efficiency in wringing the last obolus out of the travelling public! And such complete indifference to their resentment! Certainly nothing has been said about his surly manner and ill-conditioned appearance that has done him any injustice. I disembarked with my fellow travellers and accompanied them along a path which led to the entrance of a cave. We entered and found ourselves in the presence of the most celebrated of all monsters. But how different is he from what I had imagined!

He is huge, of course. His body in size and shape resembles that of a full-grown hippopotamus. I could see no legs. They seem to be buried in fat. This great inert mass of flesh lies motionless, except now and then for a slight quiver. The active part of him is his heads. They are enormous, as is his body, and two of them at least, frightful to look upon. The one on the left was snarling. Its jaws were covered with slaver. There was a look of red malignity in its eyes which made me feel that I would do well to keep out of reach of his yellow fangs. The middle head had a very different appearance. It had something gentle, and even affectionate in it; the sort of head one sees in a setter or a spaniel. Now and then it gave vent to a joyful yelp. The third head was laid along the ground, and was engaged in gnawing a bone, while from time to time, it uttered a menacing growl.

Standing near the great beast was a uniformed attendant. I drew him aside and entered into conversation with him. I learned that he had been Cerberus's keeper for the last four thousand years. He told me many interesting things. It appears that Cerberus is not to be looked upon as a dog with three heads. It is really three dogs with a single body. As the three dogs have different dispositions, and no one of them has any more power over the body than another, they, or rather it, have never been able to make a co-ordinated movement. The three dogs are anchored to the ground by a mountain of flesh. The stories of Cerberus jumping out at passers-by are all, as my informant expressed it, "flapdoodle." He went on to say that if the three heads had human intelligence it was conceivable that they might confer together, and having made up their minds what they wanted to do, use their body for some definite purpose. But such a degree of intelligence could not be expected in a dog, least of all in one whose heads were on the worst possible terms with one another. "It is open to question," the keeper said—he seemed a thoughtful kind of man—"whether the movements of the dogs' body, carried out as it were by a committee, would be effectual in achieving the ends for which a dog ordinarily moves. I can assure you, sir, when a dog is chasing a cat he doesn't want more than one mind to make up."

The only purpose which the three heads have in common is that of satisfying their appetites. They are all greedy and when food is put before them there is a race to see who can swallow most before the stomach becomes too full to receive any more. It is not to be wondered at that Cerberus sometimes suffers from acute indigestion. The keeper assured me that he knew of few more pathetic spectacles than the three heads howling with pain caused by a common stomachache.

I learned that Cerberus's reputation for being a noisy dog is quite unjustified. He cannot bark loudly with any one of his heads because he has only one set of lungs to act upon three sets of vocal cords.

Before taking leave of the keeper I asked whether it was true that Hercules once carried off Cerberus. "Yes," he said, "it is true. I can dimly remember when my father was keeper and I was a little fellow a hundred or a hundred and fifty years old, that a big fat man came one day and took Cerberus away. He soon brought him back though. My father said it was because he found it too expensive to buy the necessary dog biscuits."

Association Notes

THE ANNUAL MEETING

Out Door Attractions of New Brunswick

In these cold, wintry and depressing days what a joy it is to let our imaginations carry us back to the good old summer days: to wander along streams and pools with rod and fly and think of the big fellows we caught or missed! Why not turn your dreams into actuality and have a real vacation when you come to the Canadian Medical Convention in New Brunswick next June, and enjoy fishing, golf and motoring at their best? Bring your car and loiter leisurely along the great Saint John River, stopping every fifty or hundred miles for golf or fishing, as the spirit moves you.

New Brunswick is unique in that you can circle the entire province, about eight hundred miles, without retracing your tracks and you can get the best of out-door sports all the way. If you cannot tour the province, at least take in some of the opportunities for sport along the Saint John River. Coming direct from Montreal you drive alongside this beautiful river for two hundred and eighty miles. You make contact at Edmundston and seventy miles down river you come to Perth and Andover where there are two golf courses. A side trip of forty miles will put you on the head waters of the Tobique. Here you can get excellent trout and salmon fishing, and if you wish can obtain a guide who will provide everything including guide, board and lodging, and even tackle for eleven dollars a day. He will do everything except tie up the fish for you, and it is rumored that he has even hooked them for those who are inexpert but want a good showing.

From Andover a fifty mile drive along the main river brings you to Woodstock, where there is an excellent nine-hole golf course and more salmon pools. At Fredericton, sixty miles farther down river, is another good golf course and Hart's salmon pool where several hundred salmon are taken by fly each season. From Fredericton a two or three hours' run will put you in Saint John, the Convention headquarters. Here you have your choice of two fine golf courses, of deep sea fishing, or of numerous side trips with scenic beauty along mighty rivers, secluded lakes, or rugged coast.

If you are a golfer you will get a thrill out of New Brunswick courses. They are noted for the verdure and springiness of their turf and the scenic beauty of their surroundings. The courses at Perth, Woodstock, Fredericton and the two Saint John courses each have an individual beauty which seems insurpassable till you see the next one; and what a joy to play on green springy turf instead of parched dry fairways!

Returning from Saint John you have many choices without retracing your steps. You may go along the South Coast to Saint Andrews, enter Maine at Calais, and thence to Montreal. At Saint Andrews is the luxurious C.P.R. Hotel Algonquin with its beautiful golf course overlooking the bay.

Another attractive route is east from Saint John along the Kennebecasis River to Moncton, then north through Newcastle and Chatham to Campbellton, then along the beautiful Matapedia Valley in Quebec. This route takes you over two of the best known salmon rivers in Canada, the Miramichi and the Restigouche, and there are golf courses at Moncton and at Campbellton. You are also on the direct route to Nova Scotia and Prince Edward Island, each of which has unique attractions.

If you plan to fish it is better to make arrangements in advance. Just drop a line to the Secretary of Publicity, Dr. F. C. Jennings, 71 Waterloo St., Saint John, N.B., and we will be delighted to send you details regarding desirable guides, camps, waters and expense.

L. DEV. CHIPMAN,
For Publicity Committee.

Hospital Service Department Notes

The Transfer of Private Patients to Public Wards, and Vice Versa

A frequent enquiry received by the Department of Hospital Service concerns the transfer of patients from private to a public ward, or vice versa. When should private patients be transferred to the public ward and whose consent should be necessary? The most frequent cause of such transfer by the hospital is evident lack of ability or intention on the part of the patient to pay the room charges. It is not generally realized how often the hospital loses revenue by this means—or lack of means. In the anxiety of the moment when the patient is rushed to hospital, accommodation may be taken beyond the means of the patient and then, after the first week, payments frequently fail to materialize. Sometimes pride induces the patient or relatives to take rooms quite beyond their ability to pay; sometimes the illness proves more serious than anticipated and the budgetted expense is soon exceeded.

When the patient himself requests the change to a cheaper room, little can be said, although the physician may prefer the greater restfulness of the private room, and the nursing staff may object to a possibly troublesome newcomer in the larger ward. Through a sense of thrift or of loneliness the patient may prefer the more sociable atmosphere of the public ward. But

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

when the hospital administrator is compelled to move the patient for failure to meet the weekly financial requirement, vehement protests usually arise from the patient's relatives and frequently from the doctor in eharge, who, naturally, is concerned with the possible effect of the transfer and attendant excitement upon his patient's progress. Here, as in other hospital situations, considerable diplomacy is necessary. Few hospital administrators, although they have full authority, would arbitrarily order such a transfer without carefully investigating the relatives' promise to pay later; but unfortunately bitter experience has led them to place very little relianee in these effusive promises. If the patients are favourably known, or are vouched for by the doctor, action is seldom if ever taken. Moreover it is very seldom indeed that a superintendent signs the order for transfer without first consulting the medical attendant coneerning any possible danger to the patient which might result from such action. To do so is not the part of wisdom, for, while the doctor may at times seem and aetually be unreasonable in demanding that the patient be not moved, it is more than likely that he will cooperate with the hospital administrator by stating honestly whether or not he thinks the patient could be moved without jeopardy and, by his close relationship with the patient, may be able to assuage effectively the often unreasonable ire of the patient and his relatives. When the medical attendant definitely refuses to permit transfer, the administrator rather than exercise his own authority usually refers the matter to the medical advisory committee where such exists.

A transfer embodying a different hospital problem is that wherein the public ward patient elects to take a private ward after a few days' sojourn in the public ward. This occurs more frequently with paying public ward patients, although it is not unknown with free patients. The first few days eonstitute as a rule the most expensive period, wherein x-rays, blood chemistry and other diagnostic studies are made, operations performed, etc. As extra charges for these services to paying ward patients are usually much reduced and, in some provinces, are forbidden, it is much eheaper to spend these first few days in the public ward. Unfortunately, hospital legislation is not yet sufficiently advanced to prevent people able to pay from taking accommodation set aside for poorer people at much less than cost, and as a result hospitals are mulcted of thousands of dollars of legitimate income annually, and in those hospitals where paying publie ward patients are not eharged the staff doctors are also frequent losers.

Hospitals for Communicable and Venereal Diseases in Japan

Japan has made excellent progress, particularly in the last few years, in the extension and oversight of hospital facilities. A number of features, as described by Dr. Enji Inouye, of the Japanese Red Cross Society, in the current issue of *Nosokomeion* would be of interest to Canadian readers. For instance, all local governments, city, town or provincial, must establish a hospital for infectious diseases at their own expense, although they obtain a certain subsidy from the Prefectural Government and the National Treasury. In Canada, while the responsibility has been placed upon the municipalities, very few other than urban centres have made more than a pretence of providing such accommodation, if at all. Japan now has 95,384 such beds. Gastro-intestinal infections are exceedingly prevalent in Japan, largely because of the lack of proper water and sewage arrangements, the eating of raw fish, the method of soil-fertilization and the climate. The year 1929 showed 37,345 cases of typhoid, 4,211 of paratyphoid, and 30,253 of dysentery.

Tuberculosis.—The Minister of Home Affairs is authorized to order any town of 50,000 or more to establish a sanatorium for the tuberculous. Expenses are to be borne by the municipality and the Prefectural (provincial) Government and the National Treasury may assist. The tuberculosis death rate has not declined as in Europe and America, possibly because of the comparatively recent drift to the cities and the development of industry.

Venereal diseases.—The government is making strong efforts to control these diseases. Here also the Minister for Home Affairs may order a municipality or other recognized agency to establish dispensaries for the care of both licensed and private prostitutes. At the present time there are 148 special hospitals for the treatment of licensed prostitutes, of whom there were in 1929 approximately 48,880. Writing in the January, 1931, issue of *Nosokomeion*, Dr. Kichiya Saigo stated that these special hospitals in 1928 provided 5,562 beds and gave treatment to 56,682 patients. Every effort is being made to disseminate sex-knowledge, for, despite these precautions, from 6,000 to 8,000 people die annually from syphilis.

A Simple Door-Check

At the recent meeting of the New Brunswick Hospital Association, Dr. S. R. D. Hewitt, of Saint John, the newly elected president of that organization, described a simple and inexpensive door-check, which not only prevents slamming but materially aids in keeping the door where placed. Two square-shaped sandbags of duck, about the shape of but somewhat smaller than bricks, are so fashioned that they will lie on the floor on either side of the free end of the door bottom. They are connected by a strip of material which lies horizontally under the door and holds the sandbags fairly closely to the door face. These bags are retained at the free swinging end of the door by a vertically placed connecting strip of material which crosses the upright

end of the door near the floor and keeps the distal ends of the bags approximately in line with the vertical end of the door. This vertical connecting piece is fastened to the door with a screw and washer. By friction these bags hinder idle swinging of the door and, should a sudden gust of wind close the door violently, centrifugal force swings the corridor bag sufficiently outward beyond the door to catch the door-jamb. Should complete closure of the door be desired, a touch of the foot will push back the corridor bag. Slight experimentation may be necessary to determine the optimum approximation of the sandbags.

Provincial Association Notes

THE 53RD ANNUAL MEETING OF THE ONTARIO MEDICAL ASSOCIATION

Hamilton—May 30, 31, June 1, 2, 1933

Arrangements for this year's program are well under way. More details will be published in later issues.

The following is a list of acceptances to date:—

Donald C. Balfour, Rochester:—
(Subject to be announced).

Louis H. Clerf, Philadelphia:—
"Bronchoscopy in diagnosis."

Reginald Fitz, Boston:—
"Diabetes" or "Periodic health examinations" or "Indigestion," or "Thoracic aneurysm."

J. F. Burgess, Montreal:—
(Subject to be announced).

Alton Goldbloom, Montreal:—
"Whooping-cough."

L. J. Rhea, Montreal:—
(Subject to be announced).

J. W. S. McCullough, Toronto:—
"The doctor and the cancer patient."

Wm. Magner, Toronto:—
"Secondary anæmia."

E. A. Linell, Toronto:—
"Autonomic nervous system."

W. J. Stevens, Ottawa:—
(Subject to be announced).

W. S. Barnhart, Ottawa:—
"Arthritis."

H. B. Moffatt, Ottawa:—
"The diseased gall bladder."

Jas. Miller, Kingston:—
"The action of tissue extracts upon malignant growths."

Geo. C. Hale, London:—
"Arteriosclerosis."

W. P. Hogarth, Fort William:—
"Treatment of complications of gonorrhœa in private practice."

C. D. Parfitt, Gravenhurst:—
"Early diagnosis of tuberculous lesions."

G. K. Wharton, London:—
"Histology and pathology of the pancreas."

G. H. Stevenson, Whitby:—
"Psychiatry in general practice."

H. D. Logan, Lindsay:—
(Subject to be announced).

Geo. Shanks, Toronto:—
"Medical experiences in the East."

Goldwin Howland, Toronto:—
"The relations and inter-relations of the mind, the endocrine glands, and the sympathetic nervous system, as observed in the neuroses and psychoneuroses."

T. A. J. Duff, Toronto:—
"Injection treatment of varicose veins and hæmorrhoids."

H. J. Shields, Toronto:—
"Local anæsthesia in general practice."

H. K. Detweiler, Toronto:—
"Jaundice."

N. E. Berry, Kingston:—
"Moving picture demonstration of pyelography and urological cases."

John Hepburn, Toronto:—
"Common applications of the electrocardiograph."

W. E. Gallie, Toronto:—
(Subject to be announced).

A. R. Lindsay, St. Catharines:—
(Subject to be announced).

C. C. McCullough, Fort William:—
"Sinus infection."

A. B. Whytock, Niagara Falls:—
(Subject to be announced).

J. M. Livingston, Kitchener:—
(Subject to be announced).

F. I. Reid, Chatham:—
"Spinal anæsthesia or "Acute intestinal obstruction."

H. M. Young, Iroquois Falls:—
(Subject to be announced).

J. G. Cunningham, Toronto:—
"Silicosis."

H. E. Preston, Brockville:—
(Subject to be announced).

Grant Bird, Oshawa:—
"Abdominal emergencies exclusive of appendicitis."

G. E. Richards, Toronto:—
(Subject to be announced).

E. H. Shannon, Toronto:—
(Subject to be announced).

The Ontario Medical Association

DISTRICT NUMBER ONE

"Cancer-conscious," was the theme word for the meeting in Chatham on October 5th of District Number One of the Ontario Medical Association. This was the climax of the discussion of malignancy by the several county medical societies, at each of which meetings some phase of the subject was the topic of study. The general plan was: discussion introduced by a guest-speaker, with the participation also of local members; then as a contribution to the District Meeting a summary of both paper and discussion was given, by an appointed reporter. The interest that was addueed was notable, and it was felt by many that the question of cancer-control rested almost entirely in the hands of the family physician, and further that the knowledge of early symptoms was to be determined by a review of carefully preserved histories and case records.

During the month preliminary to the District Meeting, papers were presented to the County Societies by Drs. Busby, London, Gordon Murray, Toronto, F. W. Luney, London, Septimus Thompson, London, H. O. Howitt, Guelph, L. J. Austin, Kingston, Roy Shier, Toronto, and C. Parker, Toronto. The reporters for the several county meetings were: Middlesex, Dr. W. H. Woods, Mount Brydges; Academy of Medicine, London, Dr. E. M. Watson, London; Essex, Dr. J. A. Davis, Windsor; Kent, Dr. F. I. Reid, Chatham; Lambton, Dr. P. M. Brown, Camlachie; Elgin, Dr. F. O. Lawrence, St. Thomas.

The final papers were given by Dr. J. C. Meakins, of Montreal, on "The Cancer patient"; and Dr. F. J. H. Campbell, London, on "Cancer research." Each of these was of a high order of excellence. It was a matter of regret that a sudden illness prevented Dr. Gordon Richards from being present to give his paper on "Radio-therapeutics in cancer."

The business side of the Ontario Medical Association was presented during the meeting by Dr. J. H. Holbrook and Dr. T. C. Routley, while at the luncheon conference Dr. Neal instituted the Sectional Committee on General Purposes.

Arrangements by the local Executive were effective in providing a setting for a delightful and profitable day, and a record attendance. The following were in charge of the Kent County Medical Society—Doctors Hall (President), C. C. White (Vice-President) and E. E. McPherson (Secretary).

Dinner was served in Hotel Pitt, following the afternoon session, and was attended by nearly two hundred. The guest-speaker was Hon. J. M. Robb, Minister of Public Health, who outlined the policy and plans for cancer control, and also spoke on the matter of medical services in the relief program of the Provincial Government. A public meeting followed and was addressed by Hon. J. M. Robb, the Deputy Minister of Health, Dr. McCullough, and Prof. J. C. Meakins, of Montreal, who made a forceful presentation on "Cancer warnings that all should know."

DISTRICT NUMBER FOUR

The Annual Clinical Day of District No. 4 of the Ontario Medical Association was held in Hamilton on November 2, 1932. Clinical sessions were held both morning and afternoon at the Hamilton General Hospital, in conjunction with the Hospital Staff and the Hamilton Academy of Medicine.

The surgical clinic was conducted by Dr. Donald Guthrie, of Sayre, Pa., and the medical clinic was conducted by Dr. Geo. Martin, of the Buffalo City Hospital. Clinical cases were presented by members of the Hospital Staff.

An attendance of 160 was registered. At 4.30 p.m. the meeting of district counsellors, presidents and secretaries of county societies was held. Dr. T. C. Routley was present. At this meeting, ways and means of presenting the case for the medical profession to the various local welfare boards were discussed fully.

The annual dinner was held at the Royal Connaught Hotel, at which meeting Dr. Colbeck, Counsellor of District No. 4, Dr. Warren, President of the Hamilton Academy of Medicine, and Dr. J. Howard Holbrook, President of the Ontario Medical Association, were speakers. Dr. T. C. Routley read the recent provincial Order-in-Council dealing with the care of indigency and the distribution of relief funds in so far as it affected the medical profession.

Dr. F. F. Tisdall, of Toronto, addressed the meeting on "The result of recent research work at the Hospital for Sick Children." His talk was illustrated by lantern slides. Following this, under the chairmanship of Dr. Routley, the meeting was thrown open for general discussion of the aforementioned relief legislation. Many members presented the problems of their own municipalities and a very full discussion was entered into.

J. H. ELLIOTT

DISTRICT NUMBER EIGHT

The annual meeting was held in the Chateau Laurier, Ottawa, on November 4, 1932.

The morning session was given up to four twenty-minute papers by physicians from the District. The subjects covered were: "Cough as a symptom in non-tuberculous and non-pulmonary diseases," by Dr. D. A. Carmichael, Royal Ottawa Sanatorium; "Varicose veins,

their treatment and complications," by Dr. J. A. Johnston, Carleton Place; "Toxæmia of pregnancy," by Dr. Ernest Couture, Ottawa; "Danger signs in diseases of the ear," by Dr. J. K. M. Dickie, Ottawa. These twenty-minute papers proved popular in bringing out a large attendance and good discussion.

After luncheon, Dr. J. H. Holbrook, the President of the Ontario Medical Association, gave an earnest and appealing address covering important matters facing the medical profession of Ontario. Dr. T. C. Routley, Secretary of the Ontario Medical Association, also gave an address and in a spirited and forceful manner presented some urgent problems for consideration.

The afternoon session was given over to Dr. Joseph Colt Bloodgood, of Baltimore, who gave a clinical address on "Breast tumours" and a demonstration on breast examination.

The evening session was again given over to Dr. Bloodgood, and his subject was, "What every doctor should know about cancer." Special reference was made to cancer of the skin, mouth and cervix. The Ottawa Dental Association was invited to be present at the evening session and a large number of the Ottawa dentists attended.

The meeting was the largest and most enthusiastic that No. 8 District has held. The large attendance being partly due to the presence of Dr. Joseph Colt Bloodgood, who gave two masterly presentations.

Dr. R. K. Paterson, the present Counsellor, was again nominated for Counsellor of the District and Dr. George Fenton was again elected *Vice-Counsellor.*

Medical Societies

Toronto Academy of Medicine

The Stated Meeting of the Academy of Medicine, Toronto, on January 3, 1933, was the Annual Library and Historical Night.

The following presentations were made:—

1. (a) Tariff of Fees, 1873, R. Hunter Robinson; (b) Holograph Letters of James Gregory, M.D., Hammett Hill, Ottawa; (c) Barometer of Joseph Workman, M.D., A. E. Lavell; (d) M.D. (Toronto) Hood of John McCrae, M.D., N. B. Gwyn. Professor Klotz acknowledged these gifts with some most interesting and illuminating comments. He had known Dr. John McCrae intimately and they had been co-workers for seven years. He recalled him as a physician, scientist, author and raconteur.

2. Medical Texts, the gift of Dr. T. A. Bertram, of Dundas, acknowledged by Dr. N. B. Gwyn.

3. Jenner's "Inquiry", 1800, presented by Dr. M. C. Watson.

The paper of the evening was Dr. W. V. Johnston's sketch of "Dr. J. H. Garnier," who practised in Lucknow from 1860 to 1898. His description of this violently eccentric, and yet extremely able man, was perfect both in matter and presentation. Doctor Garnier was an indefatigable worker and made an exhaustive study of birds, mammals and reptiles. His collection of reptiles was most complete and contained not only all of the local varieties but specimens from many other parts of the world. It was finally sold to the University of Toronto.

Professor Bensley, of the Biological Department of the University, in speaking of the great work of Doctor Garnier as a naturalist, remarked that he was pleased to note the interest being taken in the pioneer physicians of Ontario. He said that not only because of their influence on medical science; but also because of their contributions to all fields of biological science, we owe them a debt we can scarcely repay.

Following the program, the meeting adjourned to the Journal Room, where the Librarian, Miss Poole, had arranged a very interesting exhibit of old books and other material.

According to custom, the wives of the Fellows had been invited, and a large number availed themselves of the opportunity to see the many paintings, engravings, prints and other interesting material.

GILBERT PARKER, *Honorary Secretary*

The Lincoln County Medical Society

Dr. S. E. Whitnall, of Montreal, gave an illustrated address to the Lincoln County Medical Society on December 8th, his subject being "The Anatomist's View of Chiropractic." Doctor Whitnall dealt with his subject in a brilliant and humorous manner and the address was very much enjoyed by those present. On December 17th, the annual meeting of this Society was held at the home of Doctor Greenwood, St. Catharines, when the election of officers took place.

The Montreal Medico-Chirurgical Society

SECTION OF PÆDIATRICS

A meeting of the newly-constituted Section of Pædiatrics of the Montreal Medico-Chirurgical Society was held on November 25, 1932, at the Children's Memorial Hospital. An important symposium on "Lead-poisoning in children" was conducted by members of the staff, which was comprehensive and well-planned.

Dr. Harold Cushing, the President of the Section was in the chair and introduced the subject. He said that sixteen cases of lead poisoning in young children had been admitted to the Children's Memorial Hospital since the

beginning of the year, all of them under other diagnoses. Two of them proved fatal with acute cerebral manifestations. Doctor Cushing stressed the importance of correct and early diagnosis and said that in the presence of certain manifestations, such as anæmia, weakness, convulsions, and paralyses, lead-poisoning should be thought of as a possibility. If lead-poisoning were looked for surprises would be in store.

In casting about for the source of the lead in cases of poisoning, in view of the well-known fact that children are apt to put everything into their mouths, the paint on toys and cots naturally fell under suspicion. An examination was made of the paint on these articles and in most cases white paint was found to be a zinc compound, which was harmless, and devoid of lead. Yellow paint, however, appeared to be composed of lead chromate, and certain imported toys were found to contain a deadly amount of lead. There was evidence that some of the toys that Doctor Cushing exhibited had been sucked or chewed. One toy, in particular, had been found to contain enough lead to kill two children. Doctor Cushing also referred to the fact that in certain countries of Europe it was against the law to paint articles of this kind with lead paint, but, so far as he knew, there were no legal restrictions on this side of the water. The practice, clearly, was a most dangerous one.

Dr. A. E. Childe demonstrated a number of skiagrams in which broad dense white bands were manifest at the growing ends of the long bones and at the costo-chondral junctions. Similar white bands could be produced by the ingestion of bismuth and phosphorus, and had also been seen in cases of rickets and cretinism, but a careful enquiry into the history would make the situation clear. An examination of the wrist and knee-joints by means of the x-ray would usually disclose the correct diagnosis. Not infrequently lead-poisoning was diagnosed first by the radiologist. The appearances referred to, which are only found in children, were always suspicious and should rouse the attention of the clinician to the possibility of lead poisoning.

Dr. I. M. Rabinowitch presented Tables, based on actual tests, which showed the relative solubility of lead and its various salts. He demonstrated that though the mode of entry of lead in the body was an important factor, toxicity of the different lead compounds was largely dependent upon solubility; apparent discrepancies were ruled out by the fact that some lead compounds are more soluble in blood serum than in water. The hydrochloric acid in the stomach and the general state of acidosis also rendered some relatively insoluble lead compounds more soluble and hence more toxic. The mechanism of transportation and deposition of lead in the human body was then dealt with and it was shown why lead readily deposits in bone. Doctor Rabinowitch pointed out, that with modern delicate methods of examination, lead was commonly found in urines of normal individuals. The differences between the normal and pathological are, therefore, quantitative and not qualitative. From many experiences, however, he was able to state that an amount greater than 0.2 mgrm. per litre was pathological. Analyses were then shown which indicated that some so-called lead-free paints were not lead-free.

Dr. L. J. Rhea discussed the modes of entrance of lead into the system—by the lung, the alimentary tract, and the skin—and the relative susceptibility of the various organs. Lead had a predilection for the liver, the bones, and the nervous system. Yet, none of the lesions found could be called specific for lead. All could be, and frequently were, produced by other causes. However, certain morbid lesions were suspicious. Doctor Rhea showed a number of microscopic sections of the brain taken from cases of lead-poisoning to illustrate these. The conditions were a proliferation of the endothelial cells of the capillaries, often leading to obstruction, rupture of the capillaries, with hæmorrhage, and a "lymphocytic collar" seen around the small vessels. In some cases, also, there were evidences of meningo-encephalitis. Doctor Rhea also demonstrated by means of slides the action of lead on the growing ends of the bones. The bony cells tended to be arranged in parallel rows at the epiphyses at right angles to the articular surface, and these rows were thicker than normal. The marrow, which should normally be present, was replaced by fibrous connective-tissue. The condition was a true osteo-sclerosis, an inflammatory reaction to an irritant. It was this zone of thickened bone which gave the dense white band on the radiographic plate.

Dr. H. S. Mitchell demonstrated very clearly and convincingly a number of children affected by lead-poisoning and referred to the difficulties in diagnosis. All the cases of the kind admitted to the Children's Memorial Hospital had been diagnosed otherwise, notably as tuberculosis, tubercular meningitis, poliomyelitis, appendicitis, and brain tumour. Some of the very acute cases had been regarded as cases of simple "convulsions." Doctor Mitchell referred to the experiences in Japan, where a number of other conditions had been noted as leading to confusion in diagnosis. These were suppurative meningitis, infantile beri-beri, tetanus neonatorum, and peripheral neuritis. Generally, however, the correct diagnosis could be made on the basis of the history, a lead line on the gums, stippling of the red blood corpuscles, skiagrams of the wrists and knees, and

the detection of an undue amount of lead in the urine. Many cases of lead-poisoning in children doubtless went undetected, but diagnosis was not difficult, if only the condition was thought of.

Dr. S. Graham Ross discussed the treatment. In acute cases it was necessary to remove the lead from the circulation as quickly as possible and fix it in the bones. This was done, preferably, by giving milk in as large quantities as possible. Also, calcium salts, in the form of the lactate and gluconate, either by mouth, intramuscularly, or, in cases of urgency, intravenously. Subsequently, if the patient survived, the question as to whether an attempt should be made to eliminate the lead from the system should be made or not would arise. On the whole Doctor Ross thought that in very young children, who were notoriously liable to involvement of the brain and meninges, it might be better to delay this attempt until about the age of four years or more. In any case, where elimination was to be attempted the child in question should be hospitalized in order that it might be under continuous supervision. The agents to be employed for elimination were diet and drugs. The diet should be largely protein and poor in calcium, and, as regards drugs, potassium iodide, hydrochloric acid, and ammonium chloride were useful.

It was clear, from the evidence presented by the various speakers, that there was in the case of very young children a definite health hazard in connection with painted toys and cribs and that it was time that the general public should be made aware of this fact. No doubt, many babies lost their lives unnecessarily.

At the close of the meeting refreshments were served, and a vote of thanks was passed to the management of the Hospital for a helpful and pleasant meeting.

The Montreal Physiological Society

At a meeting of this Society, held on December 19, 1932, Drs. J. B. Collip, H. Selye and D. L. Thomson presented a paper on the "Gonad-stimulating hormones in hypophysectomized animals."

More than 600 rats have been hypophysectomized by a modified Smith parapharyngeal approach. The operation leads to cessation of growth, with atrophy of the thyroids, adrenals and gonads. In the male, both the germinal epithelium and the interstitial tissue are reduced, and so also are the accessory sex-organs. Treatment with anterior-lobe implants permits complete replacement therapy, whereas treatment with the purified anterior-pituitary-like hormone (A.P.L.) of human placenta does not check the degeneration of the germinal epithelium, but causes over-development of the interstitial tissue and of the accessory organs. Adult females, or immature females, in which precocious puberty has been induced by A.P.L. treatment, show no œstrus cycles after hypophysectomy; continued injection of A.P.L. leads, however, to vaginal cornification lasting for days or weeks. Females hypophysectomized before puberty do not display œstrus when treated with A.P.L. but pseudo corpora lutea appear in the ovaries. It is evident that A.P.L. acts directly upon the gonads, although it cannot replace the whole anterior hypophysis. A chemical dissection of anterior pituitary extracts has been commenced, and growth-promoting and thyroid-stimulating fractions have been partially purified and tested on hypophysectomized animals. Female rats hypophysectomized during lactation rapidly display failure to secrete milk; ovariectomy does not have this effect. No means of restoring milk secretion in hypophysectomized rats has yet been discovered. Female rats hypophysectomized during pregnancy may successfully bear living young, but are unable to supply them with milk; the maternal instinct is not impaired.

Dr. Ronald J. Christie read a paper on "The function of the carotid gland." The structure and innervation of the carotid gland was described and the morphological evidence that it might be a gland of internal secretion, in some way associated with the carotid sinus, was emphasized.

Extracts of a benign tumour of the carotid gland in man were shown to contain a vaso-depressor substance in high concentration, which differed in certain respects from histamin, acetylcholin, adenylic acid and "Kallikrein". These extracts also acted as a powerful stimulant to the virgin guinea-pig uterus. The name "carotidin" was suggested for this principle which could also be demonstrated in the carotid gland of the elasmobranch. The carotid gland of the elasmobranch is also associated with adrenalin formation, from which the depressor principle has to be separated. A possible explanation of this association of the carotid gland and adrenal medullary function in the lower animals was advanced.

The Niagara District Medical Association

The Niagara District Medical Association, which covered the Counties of Welland and Lincoln and the City of Niagara Falls, has been disbanded, owing to the fact that the component societies are so active that there is no necessity for the District Society.

The Middlesex County Medical Association

At the annual meeting of the Middlesex County Medical Association, considerable dis-

cussion took place with reference to the medical care of relief patients. The Association put itself on record as favouring allowing families on relief to choose their own physicians. Dr. W. H. Woods, of Mount Brydges, led the discussion on cancer clinics. Dr. C. H. McDougall, President of the Association, led the discussion on smaller hospitals. He stated that these now occupy a very important place in the community life, doing a very necessary work. He deplored the movement among hospitals and nurses' associations to permit training schools in only the larger hospitals. This was followed by a paper by Dr. M. H. Fletcher, of Strathroy, on "Diabetes".

The York County Medical Society

The annual meeting of the York County Medical Society was held in Newmarket on December 15th. After the election of officers, when Dr. C. E. Hill, of Lansing, was elected *President* and Dr. W. S. Caldwell, of Maple, *Treasurer,* the following speakers contributed to the program: Dr. C. J. Devins, Aurora, Dr. W. L. Carruthers, of Mount Albert, Dr. John Oille and Dr. R. J. P. McCullough, of Toronto.

University Notes

Cambridge University

The King has been pleased to approve that Walter Langdon Brown, M.D., F.R.C.P., be appointed Regius Professor of Physic in the University of Cambridge in succession to Sir Humphry Rolleston, Bt., G.C.V.O., K.C.B., M.D., who retires on September 30th on completion of his term of office.

Dr. Langdon Brown is the eldest son of the late Dr. John Brown, Minister of Bunyan Meeting, Bedford, and Bunyan's biographer. He was born in 1870, and was educated at Bedford School. From there he went to St. John's College, Cambridge, of which he became a scholar and Hutchinson research student. In medicine he was a pupil of Sir Michael Foster, and received his hospital training at St. Bartholomew's, where in time he succeeded to the position of physician. He is now consulting physician at that hospital.

McGill University

The elective courses held during the year in the Faculty of Medicine were attended by a large number of students. Believing that these courses are of such importance that they might be attended with profit by practitioners in town, by members of the resident staff in hospitals, and assistants in various departments of the Medical School, it has been decided to embark on an extension of the work. The lectures will be extra-curricular and each department will be asked to offer short courses or demonstrations. While primarily intended for students, invitations will be sent to graduates as well, for it is the opinion of the Faculty that the expansion of electives is the best means of furthering graduate study. It is hoped to extend the work in such a way that the exceptionally good laboratory and clinical facilities of the School may be more utilized for graduate instruction.

A generous donor who wishes to remain anonymous has given $25,000 to be used in making a study of cancer through observation and treatment of the living patient. The small clinic established a few years ago in the Department of Obstetrics and Gynæcology will be extended by including a diagnostic and therapeutic department, with an adequate follow-up service. A new Out-Door Clinic will be established as part of the General Surgical Out-Door Clinic under the control of the Department of Surgery. The same donor later contributed a further $3,000 and Mr. C. W. Lindsay, of Montreal, gave $1,000 to be used for clinico-pathological studies on the reaction of various forms of cancer to radium.

University of Toronto

Registration in the Faculty of Medicine, University of Toronto, Session 1932-33: first year, 169; second year, 155; third year, 145; fourth year, 117; fifth year, 115; sixth year, 126; Diploma in Public Health, 10; Bachelor of Science (Medicine), 2; occasionals, 4; post-graduate, 4. Total, 847.

The George Armstrong Peters prize has been awarded to Dr. William Strathearn Keith, a graduate of 1927, for his work on transplantation of bone. This prize may be awarded biennially to a graduate of the University of Toronto of not more than ten years' standing, who, in the opinion of the Committee on Fellowships and Scholarships, has made a sufficiently important contribution to surgical science. The prize consists of one hundred dollars in cash and approximately one hundred dollars in sterling silver, suitably engraved.

The Baptie Scholarship has been awarded to K. J. R. Wightman. It is awarded annually to a student of the second year in the Faculty of Medicine on the record of his work in the first year, consideration being given to his financial needs. The value of the Scholarship is $100.00 together with remission of fees to the amount of $75.00 for one session.

Dr. J. G. FitzGerald, Dean of the Faculty of Medicine, who is a member of the Health Committee of the League of Nations attended the meeting of this Committee in Geneva in October.

Dr. Arthur W. Ham, a graduate in Medicine of the University of Toronto of 1926, has been appointed Assistant Professor of Anatomy. He served one year as an intern after graduation and one year in the Department of Pathology, University of Toronto. In 1929 and 1930 he held the appointment of Instructor in Cytology at Washington University, St. Louis, Missouri. For four months in 1930 he was in Kenya Colony, East Africa, working on "The Life Cycle of the Parasite of East Coast Fever and the transmitting Tick." In 1931-32 he was Senior Instructor in Pathology at St. Louis University, St. Louis, Missouri.

Drs. R. T. Noble, M. H. V. Cameron, W. J. McCollum, C. D. Parfitt and T. A. Middlebro, were elected as the representatives of the graduates in Medicine on the Senate of the University for the next four years, as a result of the recent Senate election.

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

The Annual Report of the Registrar-General for Scotland for 1931 shows that the birth-rate has farther declined and is, in fact, the lowest ever recorded. The total births registered during the year numbered 92,220, which represents a rate of 19.04 per thousand. The total number of deaths registered was 64,229, equivalent to a death-rate of 13.26 per thousand of the population. Infantile mortality was low. Deaths of infants under one year totalled 7,544, representing an infantile mortality rate of 81.8 per thousand registered live births. Only on one previous occasion, in 1923, when the rate recorded fell to 78.9, has a more favourable mortality rate been evidenced in Scotland.

The annual death rate from all forms of tuberculosis was 87 per 100,000 total population; that for respiratory forms alone being 62. Both of these rates are the lowest ever found, and are the continuation of the improvement which began in the decennium, 1861-70, when the average annual death rates were as high as 379 and 268 per 100,000 population for all forms of tuberculosis and for respiratory forms, respectively.

Malignant disease was responsible for 7,158 deaths, which is 38 more than were registered in 1930, and is equivalent to a death rate of 148 per 100,000. This is the heaviest mortality rate attributable to this group ever found in Scotland. In 1931 these deaths accounted for 11 per cent of the total number registered.

The James Mackenzie Institute for Clinical Research at St. Andrews, like most charitable institutions which depend upon public support for their maintenance, is suffering from the effects of present-day financial stringency. The Council is indeed threatened with the distinct probability of having to close its doors. The Institute was founded in 1919 by the late Sir James Mackenzie, one of the greatest medical authorities of his day. The object he had in view was the study of symptoms with a view to ascertaining the earliest possible signs of the onset of disease, and the obtaining of new knowledge regarding those common ailments—as distinct from the diseases which are the statutory concern of public health authorities—which incapacitate the population and are the chief cause of loss of working days.

Towards that end a large number of continuous health records, from birth onwards, have been collected, and it has been the confident expectation of Sir James Mackenzie and of those who have followed him that when about two generations have passed, a wealth of knowledge will be available for the benefit of the country. It is hoped that when the circumstances are known, public support will be forthcoming to enable the Institute to carry on its researches.

In the course of a lecture delivered recently under the auspices of the Glasgow Post-Graduate Medical Association Dr. A. S. M. Macgregor, the Medical Officer of Health, dealt with the milk supply of the city. He reviewed the evidence which had led him to favour the pasteurization of the general milk supply other than that from tubercle-free dairy herds. He traced the history of the incidence of milk-borne epidemic injections —scarlet fever, diphtheria, the enteric fevers, epidemic sore throat, etc.—and pointed out that these had occurred on that portion (a diminishing one) of the city's milk supply not subjected to pasteurization before distribution. In this respect Glasgow's experience was analogous to that of other large cities—that pasteurization protected the population from the menace of milk-borne infections.

As the result of a special investigation, carried out by the city bacteriologist in concert with the other four large cities of Scotland over the past 18 months by improved methods of examination, it has been found that out of 329 samples of raw milk delivered to the city by road or rail 14.5 per cent contained living tubercle bacilli. It could not be inferred from these results that retailed milk contained tubercle bacilli in this proportion because pasteurization by the holder process, as commercially carried out by many of the large distributing firms, was found to be efficient unless some defect existed in the plant. Ordinary retailed milks were found to be positive to the extent of 9 per cent as the same as the average figure of 8 per cent found

Examination at the time of discharge showed a puckering of the left fornix where there was still some purulent discharge.

Full notes of this case were written for *The China Medical Journal* in January, 1931, but it appeared under the title "Craniotomy."

V. CHUNG.

Marion Barclay Hospital,
Kongmoon, South China,
November 15, 1932.

The Treatment of Psoriasis

To the Editor:

I want to find out what is being done for psoriasis now. Some time ago I read that salvarsan was being used with most remarkable results. What is the experience of the men in Montreal with this? Does it give only temporary or prolonged freedom from the disorder?

Thanking you for this trouble and desiring to express my appreciation of the *Journal*, which I believe ranks with the best medical publications we have, I am

Claresholm, Alta.,
November 21, 1932.

J. S. HYNES.

Answer:

In reference to Dr. Hynes' inquiry, generally it may be said that there has not as yet been very much progress either as regards the etiology or a satisfactory therapy for psoriasis in the sense of a permanent cure. Arsenic, an old remedy, is thought at times to be of value; the results are variable and temporary, and the same applies to other forms of treatment. Aside from varied local therapy, embracing tar or chrysarobin preparations, colloidal sulphur, colloidal manganese, bismuth, gold salts, foreign protein therapy and ultra-violet light have all been heralded as cures, only to fall by the wayside. Nevertheless, all of them are of distinct value in the relief of a condition for which there is as yet no specific therapy.

J. F. BURGESS.

Clinical Professor of Dermatology,
McGill University, Montreal.

Show thy Art in Honesty, and loose not thy Virtue by the bad Managery of it. Be Temperate and Sober, not to preserve your body in an ability for wanton ends; not to avoid the infamy of common transgressors that way, and thereby to hope to expiate or palliate obscure and closer vices; not to spare your purse, nor simply to enjoy health: but in one word, that thereby you may truly love God, which every sickness will tell you you cannot well do without health.—Sir Thomas Browne.

Topics of Current Interest

The Final Report of the American Committee on the Costs of Medical Care

Among the significant facts and figures revealed in the report are the following:—

1. The nation's "medical dollar" (based on data for total medical bill of $3,656,000,000 for 1929) is distributed as follows:

Physicians in private practice	29.8c
Hospitals	23.4
Dentists	12.2
Medicines	18.2
Public health	3.3
Nurses	5.5
Cultists	3.4
All others	4.2
	100.0c

2. A total of 1,084,500 persons in the United States are engaged in the provision of medical care and in the sale of medical commodities, as follows:—

Personnel	*Private Practice*	*Medical Institutions or Sale of Commodities*
Physicians	121,000	21,000
Dentists	56,800	5,600
Graduate nurses	118,000	77,000
Student nurses		80,000
Public health and industrial nurses		18,800
Practical nurses	150,000	
Midwives	47,000	
Chiropodists	4,900	
Optometrists	20,200	
Osteopaths	7,700	
Chiropractors	16,000	
Naturopaths	2,500	
Religious healers	10,000	
Pharmacists		132,000
Lay-personnel in hospitals, clinics and public health agencies		196,000
Total	554,100	530,400
Grand total	1,084,500	

3. The place that medical care occupies in the nation's expenditures is shown by the following Table:—

	millions
Fuel, gas, ice and electricity	2,573
Personal adornment	2,698
Tobacco, candy, ice creams, soft drinks	3,074
Education	3,388
Recreation	3,420
Medical care	3,577
Household furnishings and supplies	4,594
Automobiles	7,882
Clothing	9,315
Rent	13,060
Food	16,137

4. Most of the money spent *directly* by the people for medical care goes for the treatment of illness and a very small proportion for prevention, as follows:—

78.5 per cent for care of illness
17.4 per cent for dental care
2.7 per cent for eye care
1.4 per cent on prevention

5. The following comparison is given between the number of deaths due to largely preventable causes, and the number of United States soldiers killed in battle or by wounds in the World War:

Killed by the World War	50,285
Killed by tuberculosis (1930) ..	88,088
Killed by cancer (1930)	119,818
Infant deaths (1930)	135,845

6. The per capita expenditure in the United States for medicines is $5.49; for public health work—local, state, and federal—it is only $1.00.

7. Practitioners' incomes are distributed very unevenly, and actual incomes are inadequate for a large number of practitioners, while they are more than adequate for some others. The extent of this maldistribution is suggested by the wide interval between the middle or median net income of $3,800 and the average of $5,300. In 1929, one-third of all private practitioners had net incomes of less than $2,500. For every physician with a professional net income of more than $10,000, there were two who received less than $2,500. The contrast is especially great between general practitioners and specialists. In 1929, the 70,000 general practitioners, as a group, received less income than the 30,000 complete specialists. The average net income of the former group was under $4,000, while that of the latter was over $10,000.

8. Costs to the individual receiving medical care were likewise found to be extremely uneven. A study of 9,000 families showed that average costs of medical care varied with the incomes of these families, but that within each income group there were wide variations in the actual cost per family.

Of families with total annual incomes under $1,200, 80 per cent paid less than $60 during a year and 1 per cent paid over $500.

Of families with total annual incomes over $10,000, 0.7 per cent paid under $60 during a year and 74 per cent paid over $500.

The report outlines the present situation in the provision of medical care, basing this summation on the findings in its twenty-six extensive studies into all aspects of the problem.

As a result of this survey into existing conditions, the report then lists the following "deficiencies in the provision of medical service which seem to be within the power of the American people—professional and lay, separately or together—to overcome at the present state of medical knowledge."

1. The people need a substantially larger volume of scientific medical service than they now utilize. This is particularly true of persons with small incomes. In spite of the large volume of free work done by hospitals, health departments, and individual practitioners, and in spite of the sliding scale of charges, it appears that each year nearly one-half of the individuals in the lowest income group receive no professional medical or dental attention of any kind, curative or preventive.

2. Modern public health services need to be extended to a far greater percentage of the people, particularly in rural areas, towns, and small cities.

3. There is need for a geographical distribution of practitioners and agencies which more closely approximates the medical requirements of the people.

4. Current expenditures for medical care in rural and semi-rural areas are insufficient to insure even approximately adequate service, to support necessary facilities, or to provide satisfactory remuneration to the practitioners.

5. Many practitioners, particularly well-trained recent graduates, should have opportunities to earn larger net incomes than they now receive. Incomes of general practitioners and of specialists should be more nearly equal than at present. The opportunity and incentive for "fee-splitting" should be removed.

6. Better control over the quality of medical service is needed, and opportunities should be provided for improving quality as rapidly in the future as it has been improved in the past. Improvement of the quality of service would include: elimination of practice by unqualified "cult" practitioners; control over the practice of secondary practitioners (like midwives, chiropodists, and optometrists); restriction of practice of specialties to those with special training and ability; more opportunity for post-graduate study for physicians, particularly rural practitioners; more opportunity for physicians to exchange experiences and to assist each other; better control, through supervision and further education, over the work of certain physicians and dentists, who, even though regularly licensed, are not competent for many functions.

7. There should be more effective control over the number and type of practitioners trained, and their training should be adjusted to prepare them to serve the "true" needs of the people.

8. There is a need for reduction of waste in many directions, such as the money spent on unnecessary medication, on services of poorly qualified or utterly unqualified "cultists," and wastes due to idle time of practitioners, high "overhead" of private medical and dental practice, unused hospital accommodations, and the sending of patients from place to place for medical service.

9. There is need for some plan whereby the unequal and sometimes crushing burden of med-

ieal expenses ean be distributed. The prevailing methods of purchasing medical care lead to unwise and undirected expenditures, to unequal and unpredictable financial burdens for the individual and the family, to neglect of health and of illness, to inadequate expenditures for medical care, and often to unequable remuneration of practitioners.

THE ESSENTIALS OF A SATISFACTORY MEDICAL PROGRAM ENUNCIATED IN THE REPORT

The following basic essentials are laid down in the report for consideration in the formulation of a plan for the provision of medical service:—

1. The plan must safeguard the quality of medical service and preserve the essential personal relation between patient and physician.

2. It must provide for the future development of preventive and curative services in such kinds and amounts as will meet the needs of substantially all the people and not merely their present effective demands.

3. It must provide services on financial terms which the people can and will meet without undue hardship, either through individual or collective resources.

4. The program must include not only medical care of the individual and the family but also well-organized and adequately-supported public health program that will apply all existing knowledge to the prevention of disease and permeate all medical practice with the concept of prevention.

5. It should include provisions for assisting and guiding patients in the selection of competent practitioners and suitable facilities for medical care.

6. It must provide adequate and assured payment to the individuals and agencies furnishing the care. That this could be provided by comparatively small individual payments from those receiving such care is indicated in another part of the report, in which it is estimated that all needed medical care of the kind customarily purchased individually could be provided, excluding capital charges, for from $10 to $40 per capita per annum, which equals 40 to 80 cents per week. This estimate is based upon the actual experience of various organizations that are now providing complete or nearly complete service for weekly or monthly fees or without direct charge to the beneficiary.

LINES OF APPROACH INDICATED

After a discussion of each of the six foregoing "essentials" the report specifies the following three major lines of approach in obtaining a satisfactory medical service which will meet these essentials:—

1. The development of types of organized or group practice that will more effectively and economically meet the community's medical needs.

2. The distribution of the costs of service over a period of time and over a group of families or individuals.

3. Provision for the planning and coordination, on a local and regional basis, of all health and medical services.

Among other data included in the report is a discussion of the kinds of organization and administration that are deemed most likely to translate its objectives into action. This is followed by a résumé of the most significant plans and experiments now under way in which the advantages and disadvantages of each are briefly summarized.

RECOMMENDATIONS OF THE COMMITTEE

I

The Committee recommends that medical service, both preventive and therapeutic, should be furnished largely by organized groups of physicians, dentists, nurses, pharmacists, and other associated personnel. Such groups should be organized, preferably around a hospital, for rendering complete home, office, and hospital care. The form of organization should encourage the maintenance of high standards and the development or preservation of a personal relation between patient and physician.

II

The Committee recommends the extension of all basic public health services, whether provided by governmental or non-governmental agencies, so that they will be available to the entire population according to its needs. Primarily this extension requires increased financial support for official health departments and full-time trained health officers and members of their staffs whose tenure is dependent only upon professional and administrative competence.

III

The Committee recommends that the costs of medical care be placed on a group payment basis, through the use of insurance, through the use of taxation, or through the use of both these methods. This is not meant to preclude the continuation of medical service provided on an individual fee basis for those who prefer the present method. Cash benefits, *i.e.*, compensation for wage-loss due to illness, if and when provided, should be separate and distinct from medical services.

IV

The Committee recommends that the study, evaluation, and coordination of medical service be considered important functions for every state and local community, that agencies be

formed to exercise these functions, and that the coordination of rural with urban services receive special attention.

V

The Committee makes the following recommendations in the field of professional education: (a) That the training of physicians give increasing emphasis to the teaching of health and the prevention of disease; that more effective efforts be made to provide trained health officers; that the social aspects of medical practice be given greater attention; that specialties be restricted to those specially qualified; and that post-graduate educational opportunities be increased; (b) that dental students be given a broader educational background; (c) that pharmaceutical education place more stress on the pharmacist's responsibilities and opportunities for public service; (d) that nursing education be thoroughly remoulded to provide well-educated and well-qualified registered nurses; (e) that less thoroughly trained but competent nursing aides and attendants be provided; (f) that adequate training for nurse-midwives be provided; and (g) that opportunities be offered for the systematic training of hospital and clinic administrators.

The development in each city of one or more hospitals into a "Community Medical Centre" is called the "keystone" of the Committee's recommendations. These centres would provide complete medical services in return for weekly or monthly fees, with, when necessary, some supplementary support from tax funds. Professional procedures, according to the report, would be under the control of the physicians, dentists and other practitioners, and financial responsibility would rest with a board representing the public.

The personal relation between patient and practitioner would be carefully maintained in such centres. Such organization, the Committee states, would be fairer to practitioners than the present system, because it would provide them with higher average incomes and would give the largest rewards to those with the greatest experience and ability.

The recommendations in general, the Committee stresses, provide for the development of existing machinery rather than the construction of entirely new organizations.

Sixteen of the 24 doctors of medicine on the Committee, 7 of the 11 members engaged in other forms of medical and public health work, and 12 of the 13 economists and representatives of the public, support the Committee's five recommendations.

MINORITY REPORTS

Besides the minority report abstracted below two representatives of American Dentistry dissent in a separate report.

The principal minority report, signed by 9 members, has seven recommendations as follows:

(1) That government competition in the practice of medicine be discontinued and that its activities be restricted entirely to certain types of service; (2) that government care of the indigent be expanded with the ultimate object of relieving the medical profession of this burden; (3) that coordination of medical service be considered an important function for local communities; (4) that united attempts be made to restore the general practitioner to the central place in medical practice; (5) that the corporate (*i.e.*, organized) practice of medicine be vigorously and persistently opposed as wasteful, inimical to high quality, and productive of unfair exploitation of the medical profession; (6) that careful trial be given methods which can rightly be fitted into our present institutions and agencies without interfering with the fundamentals of medical practice; and (7) that state or county medical societies develop plans for medical care.

Abstracts from Current Literature

Medicine

The Social Incidence of Rheumatic Heart Disease. A Statistical Study in Yale University Students. Paul, J. R. and Leddy, P. A., *Am. J. M. Sc.*, 1932, **184**: 597.

Paul and Leddy have studied the incidence of rheumatic heart disease. They point out that according to published statistics rheumatic fever is a disease seen with great frequency in hospital wards as opposed to private pavilions and consulting practice, where it is seldom encountered. Thus, among 1,000 children from the Outpatient Department of King's College Hospital, London, the incidence of those who showed evidence of acute rheumatism was 13.1 per cent, whereas among 700 children from private practice the incidence was only 0.7 per cent.

Paul and Leddy were desirous of ascertaining to what extent poverty really does predispose to rheumatic fever in America. The statistics upon which they based their conclusions were obtained from a review of the medical histories of 7,914 undergraduate students and 4,455 male graduate students. All cases of mitral stenosis were accepted as examples of rheumatic heart disease, and all

cases of endocarditis and of mitral and aortic insufficiency, in which the student gave a definite history of rheumatic fever or heart trouble following scarlet fever, were accepted. Other cases were discarded, even though heart murmurs were present. The incidence of rheumatic heart disease in this group of 7,914 undergraduate students was found to be 8.2 per 1,000 as compared with 15 per 1,000, which is an average figure obtained from statistics of comparable age-groups of individuals in other walks of life. Among the men in this group who had attended expensive boarding schools the incidence was only 5.8 per 1,000 as compared with 12.5 per 1,000 among those from high schools.

These figures support the contention that rheumatic fever is a disease which finds a lower incidence among people of ample means, though poverty would not seem to be as important a predisposing factor in determining the incidence of this disease as it does in clinical tuberculosis. E. S. MILLS

A Study of the Pathogenesis of Myocardial Fibrosis. ("Chronic Fibrous Myocarditis"). Brown, M. R., *Am. J. M. Sc.*, 1932, 184: 707.

Brown has studied the material from 1,000 consecutive autopsies in the Department of Pathology, Johns Hopkins University, in searching for myocardial fibrosis. In 110 cases areas of scar-tissue were described in the myocardium. Of these cases the underlying pathological condition considered to be responsible for the myocardial scarring was generalized arteriosclerosis in 59; 52 of these showed advanced coronary sclerosis and only 3 had normal coronary vessels. In 24 other cases syphilitic aortitis was present, involving the coronary vessels in 15 instances. Fifteen cases had a history of rheumatism, but the coronary vessels were considered to be normal in 12 of these. Of the remaining 12 cases which constitute the grand total of 110 cases, 3 had *S. viridans endocarditis,* 4 had generalized tuberculosis, 1 chronic nephritis, and 1 chronic endocarditis, probably rheumatic. Three others showed no coronary or endocardial changes. The author therefore feels justified in concluding that direct invasion of the heart muscle in syphilis and rheumatism plays a minor rôle in the pathogenesis of myocardial scarring. She feels that disease of the coronary arteries is the important etiological agent of myocardial scarring, either by infarction or the more slowly produced ischæmic necrosis of the muscle fibres. E. S. MILLS

Branch Arborization and Heart Block. Rosenthal, S. R., *Arch. Int. M.*, 1932, 50: 730.

The author reports 5 cases demonstrating lesions of the conducting apparatus of the heart, with histological studies of the entire circuit to determine the nature of the lesion. These findings were compared with their corresponding electrocardiograms. The first case is of particular interest in that it reduplicates experimental conditions. An aneurism of the sinus of Valsava, involving only the left branch of the bundle of His, was accompanied during life by a dextrocardiogram. This strongly supports the original work of Eppinger and Rothberger, in which experimental interruption of the left branch is represented graphically as a dextro-cardiogram, and questions the interpretations of Wilson, McLeod and Barker, who found that by applying the exploring electrode to the heart severance of the left branch gave a lævogram.

Arborization block *per se* cannot be considered as a distinct entity, and when present is associated with an interruption of one or both of the main branches of the bundle. Coronary sclerosis with infarction of the interventricular septum, or chronic myocarditis with marked scarring may produce the aforementioned lesion. Heart-block occurred in a case of essential hypertension. In the bundle of His were found degenerative changes which were explained as due to an increased tonicity of the small arteries and the arterioles, with prestasis and stasis of the precapillaries and capillaries.

L. J. ADAMS

The Relationship Between Paroxysmal Tachycardia and Myocardial Lesions. Major, Ralph H. and Wahl, H. R., *Arch. d. mal. du cœur,* 1932, 25: 449.

Four cases of paroxysmal tachycardia are described, with reproductions of the electrocardiograms and photomicrographs of the heart muscle. Two of the cases were considered to be of auricular origin and two of ventricular origin. In all these cases microscopic examination of the heart muscle revealed advanced myocardial lesions, but none of them would have been detected had only macroscopic examination been used, while in one case, even microscopically, several blocks of tissue had to be examined before the lesions were found. Several instances are cited of previous observations of the relationship between coronary occlusion and paroxysmal tachycardia. In all these the tachycardia was said to be of ventricular origin. The author points out that in none of the cases in his series was there any evidence of coronary disease, but adds that the underlying cause in both types of case is probably essentially the same lesion, namely, inflammation with fibrous degeneration of the myocardium.

L. G. MONTGOMERY

Cardiac Rupture with Perforation of Interventricular Septum: Report of Two Cases. Freeman, W. and Griffin, E. D., *Am. Heart J.*, 1932, 7: 732.

Cardiac rupture following thrombosis is moderately frequent, but the perforation is usually through the cardiac wall into the pericardium. Interventricular rupture, however, is extremely rare, a survey of the literature yielding only 3 cases. Two additional cases are reported in detail by the authors. As in all ruptures of the heart interventricular rupture is preceded by coronary disease, with occlusion of a branch supplying the interventricular septum. Rupture of the heart into the pericardium usually causes instantaneous death. However, in the 5 reported cases the patient survived for five and a half hours up to three days. The rupture is usually preceded by an acute illness simulating an acute abdominal catastrophe or a severe respiratory disorder. Examination of the heart in this period is usually negative. Electrocardiographic tracings may indicate coronary occlusion or myocardial fibrosis. Perforation of the septum superimposes upon the picture of coronary occlusion a symptom complex composed of renewed syncope, a progressive harsh systolic murmur and thrill over the præcordium; gradual extinction of aortic second sound; and marked disproportion between the force of cardiac action and the strength of the pulse. It is believed that the rarity of septal perforation compared with external perforation is due to the relative freedom of the septum from marked changes in the pressure applied to the sides, infarction of the septum being by no means rare, while perforation would appear to be almost a curiosity. W. H. HATFIELD

Surgery

Splenectomy in Purpura Hæmorrhagica. Eliason, E. L. and Ferguson, L. K., *Ann. Surg.*, 1932, 96: 801.

Clinical experience plus experimental investigation indicates that purpura hæmorrhagica is a dysfunction of the whole hæmopoietic system. There is no definite evidence that the spleen is the organ at fault. Splenectomy is indicated if the diagnosis is definitely established. The diagnosis is made on the following points: (1) spontaneous extravasation of blood into or under the skin and mucous membranes of the body; (2) a diminished platelet count; (3) prolonged bleeding time; (4) approximately normal coagulation time; (5) absence of clot-retraction; (6) the appearance of petechiæ in the skin distal to a tourniquet blocking the venous return but not the arterial flow; (7) secondary anæmia without constant changes in the red b/ and (8) no constant variation in the blood cells, but usually an increase rather than a decrease. Uncontrollable bleeding, whether sudden and severe or recurrent, appears to be the indication for splenectomy. Operation should be performed when the patient is suitably prepared, *viz.*, by transfusions etc., and with the hæmoglobin at least 50. Splenectomy in the early years should give the best results. After splenectomy all foci of infection should be eliminated, as toxins stimulate the reticuloendothelial system to an increased destruction of platelets.

The authors analyze 213 cases, 5 being their own. Of these 35 were acute, 160 chronic, and 18 could not be classified. The operative mortality was 13.1 per cent. In the cases reported during the last 4 years only, the mortality was 7.08 per cent. Seventy-three decimal two per cent are classed as cures, 8 per cent improved, 2.8 per cent unimproved, and the results were unknown in 2.8 per cent. The acute cases reported since 1928 showed a mortality of 13.6 per cent. Practically all the acute cases died on the operating table or within 24 hours. The causes of death in the chronic cases were operative shock (3), post-operative intracranial hæmorrhage (3), operative accident and post-operative complications (3), atypical cases (2). In the chronic cases the death rate is 7 per cent. STUART GORDON

Indications for and Results of Removal of the Spleen. Lord Dawson of Penn, *Brit. M. J.*, 1932, 2: 699.

This paper formed the opening of a discussion on this subject at the Centenary Meeting of the British Medical Association. There are only three diseases—apart from trauma and rare tumour—in which splenectomy has proved to be justified—acholuric jaundice, purpura hæmorrhagica, and splenic anæmia. In acholuric jaundice there is excessive red cell destruction in which the spleen plays an important part as an area of concentration of the reticulo-endothelial system. These patients only remain active and well at the expense of over-production in the bone marrow. Sooner or later, the over-worked marrow tends to fail, either acutely or gradually. Hence splenomegaly is advisable early in every case (but not before 12 years). Operation in youth too, is easier because of the rarity of perisplenic adhesions. Of the three features, jaundice, splenomegaly, and increased fragility of the red cells, any one may be absent. In these cases, pre-operative transfusion sometimes results in agglutination, despite careful typing. The best treatment in such an event is massive doses of alkalis.

2.4 per cent mortality and even lower in other clinics; (2) confinement in bed is limited to two to five days; (3) the period of hospitalization averages ten days; (4) it is of value in inoperable carcinomas; (5) it increases the relief in the bad-risk cases; (6) it is a valuable prophylactic measure in the early prostatic. The disadvantages are: (1) that a high degree of technical skill is required; (2) the necessary equipment entails considerable outlay; (3) an obstruction may recur; (4) malignancy may develop in the remaining gland.

Regarding the recurrence of retention the authors state that it is by no means unknown following the suprapubic operation, and that should a recurrence take place a repetition of the resection is not more difficult. Regarding a malignant change, they do not share Thomson-Walker's estimate that 16 per cent of clinically benign prostates prove to be malignant on microscopical examination. Their figures show that in 87 glands believed to be benign 3 were malignant and 1 doubtful.

Following per-urethral resection, if the deepest portion appears malignant, they consider suprapubic extirpation and subsequent x-ray therapy.

In the following types of case, per-urethral surgery is indicated: (1) contracted vesical orifice or fibrous bar, where dilatation has failed; (2) posterior commissural hyperplasia; (3) lesser degrees of median-lobe, lateral-lobe, or generalized enlargement; (4) subvesical type of gland, with encroaching intra-urethral "lobes", frequently fibrous in character; (5) localized subcervical gland hyperplasias; (6) certain types of carcinoma of the prostate, where obstruction has supervened or is imminent (in the great majority of such cases; resection enables the maintenance of micturition and the avoidance of a cystostomy); (7) cysts of the prostate; (8) calculous disease of the prostate causing symptoms.

An indwelling catheter is used for forty-eight hours pre-operatively, and vesical lavage given twice daily, using silver nitrate solution (1 to 10,000). In the presence of sepsis, impaired renal function, or other complications, longer drainage is necessary, and if at the end of ten days the condition is not markedly improved, the suprapubic Malecot catheter is advised. They prefer doing these cases under a low spinal anæsthesia. The type of instrument is described.

The indwelling catheter is maintained from three to six days, giving a vesical lavage twice daily. The patient is allowed up on the third day. Five cases are given in detail.

W. L. GRAHAM

Tumours of the Renal Pelvis. MacKenzie, D. W. and Ratner, M., *J. Urol.*, 1932, 28: 405.

New growths of the renal pelvis, as compared with those of the kidney parenchyma, are relatively infrequent. It is estimated that on an average only 5-7 per cent of all renal tumours occur primarily in the renal pelvis. There are now in the literature 318 cases of growths in this situation.

Practically all are derived from mesodermal tissue. However, a small number are of squamous-cell type. The inference is that this may be due to metaplasia or to an abnormality of development.

The more popular classification of growths of the renal pelvis is: (1) papilloma; (2) papillary epithelioma; (3) squamous-cell carcinoma; (4) alveolar carcinoma; (5) a small group of connective-tissue tumours (adenoma, fibroma, and sarcoma).

Papillomas make up 40-50 per cent of renal pelvis growths and present the same gross characteristics as papilloma in the bladder. They are very vascular and liable to bleed profusely, markedly so if calculous disease is present, as it so commonly is.

The alveolar carcinomas are probably advanced papillomatous growths and may assume a scirrhous type. These tumours are large, infiltrating, and metastasize very readily.

Papillary endothelioma comprises 20-30 per cent of such growths. This resembles papilloma, but the growth is more compact and the villous processes are clubbed and readily invade the submucosa and later involve the renal parenchyma. In a more advanced stage there is distention of the renal pelvis and the presence of multiple cysts in the cortex of the kidney.

The squamous-cell carcinoma has a rare incidence. Apparently the epithelium of the renal pelvis is capable of epidermatization. This tumour is large, with pronounced cornification and many epithelial pearls and invades and metastasizes extremely rapidly. There is but one fibroma and one adenoma of the renal pelvis on record.

The most emphatic etiological factor is renal infection and calculi, particularly if neglected.

The symptomatology primarily includes hæmaturia, usually of intermittent nature. Pain occurs if the growth has obstructed the ureteropelvic junction and results in hydronephrosis or hæmatonephrosis. Colic is associated with the passage of blood clot or transplants down the ureter. Rarely can palpable masses be demonstrated, except when there is obstruction to urinary outflow. The passage of tissue shreds mixed with blood-clots will often give a clue to such a growth along the urinary passages. Frequency, urgency and dysuria arise when the

bladder becomes irritated due to blood clot or pieces of tumour.

The diagnosis is based upon the history, physical findings, urinary findings, and a very careful cystoscopic examination and pyelography.

On account of these tumours tending to involve the ureter and even the bladder the treatment of choice to-day is nephrectomy and complete ureterectomy. A case is cited.

V. J. BERRY

Ophthalmology

Latent Infection of the Lachrymal Duct. Kalt, E. and Kalt, M., *Ann. d'Oculistique*, 1932, 169: 1.

These authors conclude that latent infection of the lachrymal ducts originates generally from the conjunctiva. Its nature is not well known, but without doubt it is microbic, but also more likely to affect receptive individuals such as the aged. It corresponds to a pathological entity from which it is necessary to distinguish the ascending infections of nasal origin, which obliterate first the inferior orifice of the sac, with subsequent ectasia. The distinction between the two affections founded on clinical and pathological anatomy seems evident, and the authors think a good title to be given to the first is dacryocystitis of follicular stenosis.

The diagnosis of latent infection is very difficult in certain cases. It was found that the permeability to injection is a valuable sign, certainly the best that we actually possess, on condition that it is performed by an operator who is accustomed to this work; that it is not sufficient to say that it was done, but how. And even if the fluid passage was easy, the sac may have been gravely altered. The bacteriological examination is a secondary matter, and gives uncertain results.

S. HANFORD MCKEE

Diplobacillary Infection. Morax, V., *Ann. d'Oculistique*, 1932, 169: 81.

This article is a retrospect by Morax on his conjunctival work, especially diplobacillary infection, from 1895 to 1932. It is interesting after thirty-six years of modest research to look back over the road one has travelled. In this connection Morax describes in detail the first case of diplobacillary conjunctivitis that he saw, and how he realized then that the microörganism that he found differed from the Koch-Weeks' bacillus. He also describes how a colleague who has since become eminent volunteered to have his conjunctiva inoculated, and the study which was made following this of the course and contagiousness of this form of inflammation. Morax was not able to inoculate animals, but describes how he was called to examine a chimpanzee, a recent arrival at Bordeaux, and found a well marked diplobacillary conjunctivitis. Hen then tried to inoculate another one but without success.

Morax does not now believe that diplobacillary infection is confined strictly to the conjunctiva, but is also found in the nose and angles of the mouth. The clinical appearance in the chimpanzee was very similar to that found in the human.

S. HANFORD MCKEE

A Case of Mucocele of the Maxillary Sinus Affecting the Ocular Globe. Shoji, Y., *Ann. d'Oculistique*, 1932, 169: 267.

M. S., an adult of 45 years, who acquired syphilis at 17, and three years ago submitted to an operation for nasal empyema, four months previously, had noticed a certain amount of irritation about the left lower lid This lasted about three or four days, but since that time the region of the lower lid and cheek had progressively enlarged. He complained of binocular diplopia. Examination showed a swelling about the inferior part of the left lower lid. The tumour, of elastic consistence on the nasal side and of bony on the temporal, occupied nearly all the length of the lid and measured 18 mm. from above downwards. The left globe was displaced above and to the left, and the ocular movements downward were very limited.

Under novocaine anæsthesia an incision was made over this mass, where a fibrous growth was found on the anterior surface of the maxillary sinus. On perforation of the part a brown liquid escaped. After ablation of the tumour, one could see the whole cavity of the maxillary sinus. Convalescence followed in one week's time.

Cases of mucocele in maxillary sinusitis have been observed rarely in ophthalmology. The mucocele enlarges the cavity and may cause inflammation of the retina, or inflammation and atrophy of the optic nerve. The deviation of the ocular globe is the chief ocular symptom, which disappears upon opening and evacuation of the cavity.

S. HANFORD MCKEE

Therapeutics

A Case of Tuberculous Pericarditis with Effusion Treated by Means of Pneumopericardium. Thomas, G. W., *Am. Heart J.*, 1932, 7: 771.

A case of tuberculous pericarditis with effusion treated by pneumopericardium and cardiolysis is reported in detail, with a brief review of the literature on the subject. The patient, a boy eighteen years of age, developed a large pericardial effusion. Repeated tapping with air injections were done over a two months'

period, the patient being discharged at the end of another month. Five months later he returned to hospital when a cardiolysis was done, and when last heard from six months later was doing well. The injection of air into the pericardium as a therapeutic proeedure was first reported by Wenckebaeh in 1910. Sinee that time approximately 16 eases have been reported, and without exeeption all the authors thought the procedure gave symptomatic relief and slowed up the reaccumulation of fluid. Of the 16 eases treated 9 died, but in only 1 case did death seem to be related in any way to the proeedure. From the present ease and those in the literature the author believes that it is not possible to estimate the therapeutie value of artificial pneumopericardium. It did not cure this patient nor prevent the necessity for operation later. The ehief therapeutic advantage seems to prevent the rapid reaecumulation of fluid following tapping. It also lessens the resistance the heart has to work against by substituting a compressible gas for a non-compressible fluid, and it seems a rational procedure where one wishes to prevent the formation of pericardial adhesions. In conclusion, the author states that the method of artificial pneumopericardium would seem to deserve more extensive trial than it has yet been accorded.

W. H. HATFIELD

Bismuth in the Treatment of Cardiovascular Syphilis. Blackford, L. M. and Boland, J. H., *J. Am. M. Ass.*, 1932, 99: 1903.

The author became interested in this form of medication because of a case which had not improved after six months of mercury, potassium iodide and digitalis, but responded quickly to bismuth. He considers sodium bismuth tartrate the best produet and gives 2 c.c. of a 1.5 per cent solution twice a week for 5 weeks, repeating these courses at intervals. His cases all involved either the aorta itself or the valve. Luetie cases with hypertension do better on specific treatment, although some authorities think this condition is not any more common among lueties than among others.

Where œdema presents a problem salyrgan ean be used (2 c.c.) to bring on diuresis. Digitalis used cautiously is of value also.

The results were encouraging. A fair number were able to return to work and others undoubtedly lived longer than they would have been likely to do under other treatment. One is convineed that the treatment is worth trying out.

P. M. MACDONNELL

The Serum Treatment of Pneumonia. Cecil, R. L., *Brit. M. J.*, 1932, 2: 657.

The question of serum therapy in pneumococcal pneumonia is discussed in detail. Types I, II and III pneumococci are responsible for two-thirds of the cases of pneumonia seen in America. From the remaining heterogeneous group IV, 29 definite types have reeently been isolated, some of which are quite important causative agents of pneumonia in ehildren.

A very impressive series of cases is presented—239 type I cases being included. The results of serum therapy were adequately controlled by equal numbers of serum-untreated cases, while some 175 Type III and group IV eases were also given the serum and compared with a like number of untreated cases. All the cases were first typed by rapid methods (Krumwiede's or Sabin's) if possible. Felton's refined and eoncentrated polyvalent serum was used and the preparation of this product is given in detail. Its use is relatively safe, but all patients were first given test doses, intradermally and conjunctivally. The first intravenous dose of serum was 5 c.c., 100 c.c. in all (100,000 units) being given during the first 24 hours and repeated the second and third days (the doses were halved if the first day's response was good). Type II cases were given double the above doses. The serum was found to be quite without effect in Type III and group IV cases. The results obtained were strikingly good in Type I cases, the mortality being reduced from 25-30 to 10 per cent. In Type II cases the results were not so impressive, but were sufficiently good if the serum was given within 72 hours of onset.

The possibility of the discovery of a more highly specific agent for the treatment of pneumonia is referred to. The work of Avery and his eo-workers on bacterial enzymes, and their discovery of an enzyme affecting Type III pneumococcus are promising. At present, however, we must rely upon serum therapy, which by the use of a refined, concentrated polyvalent serum, has been shown to be a simple, practical and valuable therapeutie measure in Type I and II cases.

W. FORD CONNELL

Some Considerations on the Influence of Copper and Manganese on the Therapeutic Activity of Iron. Sheldon, J. H., *Brit. M. J.*, 1932, 2: 869.

The claim that both copper and manganese are active supplements to iron in the eure of certain anæmias is diseussed. Many of the conelusions are drawn from experimental work on rats. Both metals have been found to be essential eonstituents of protoplasm, the first for the conversion of iron to hæmoglobin, and the seeond for the proeesses of reproduction. In the treatment of the nutritional anæmias of infants the value of adding small amounts of copper to the iron used has been established

Copper has been supposed to act as a catalyst; it appears to stimulate both growth and hæmoglobin formation, iron being heavily drawn on for both purposes. For this reason the administration of copper alone to an infant may result in a relative iron deficiency. Nearly all the iron preparations (80 per cent) used in therapy contain copper as an impurity; hence the value of the large modern doses. Copper and iron are the only metals shown to be stored in liver in fetal life; at birth up to ten times the adult amount of each may be present. A small store of these metals predisposes to anæmia and possibly to growth retardation. Feeding of adequate mineral to the mother during pregnancy is recommended. One litre of human milk contains 2 mgrm. iron and 0.25 mgrm. copper (more than does cow's milk). Probably only about 10 per cent of these amounts is retained. Since copper occurs as an impurity in so many iron preparations and in the food, it is difficult to assess its value in the treatment of adult anæmias. Many cases of anæmia show an increase of copper in the blood. In pernicious anæmia, however, there appears to be very little copper. These findings are not understood.

Manganese is chiefly concentrated in the liver, kidneys, pancreas and suprarenal. The amount in the blood serum is slightly increased during pregnancy. There is no reserve store in the fetal liver. It is probably essential to the proper function of the endocrine organs concerned with reproduction, notably the anterior pituitary. It apparently plays no part whatever in hæmoglobin formation.

W. FORD CONNELL

Hygiene and Public Health

Some Common Industrial Health Hazards. Hayhurst, E. R., 19th Annual Convention, International Association Industrial Accident Boards and Commissions, Sept., 1932.

Hayhurst's definition of an occupational disease is as follows: "An occupational disease is an affliction which is the result of exposure to an industrial health-hazard, while an industrial health-hazard is any condition or manner of work that is unnatural to the physiology of the human being so engaged." As a preface to his remarks he lays down the principle that any unit of government, in order to obtain an intelligent grasp of the nature of occupational disease, should have a law requiring the reporting of such diseases. In Ohio a law requiring the reporting of occupational diseases has been in existence since 1913, but it was only in 1921 that certain occupational diseases became compensable under the workmen's compensation act. Evidently before the act was passed reporting of these diseases was somewhat perfunctory, for following the passing of the act the number of cases reported increased nearly five-fold.

The commoner health hazards are: (1) poisons, particularly lead, and skin irritants, (2) fatigue, (3) dust, and (4) air-conditions, particularly overheating. During the five-year period ending June 30, 1930, 897 cases of lead poisoning were reported to the Ohio Department of Health. The storage battery industry contributed the largest number of cases, but the painting, automobile and brass and bronze industries were major offenders. Hayhurst agrees that workers are rarely poisoned by lead by any other method than by inhalation.

According to Hayhurst the use of petroleum distillates (petroleum ether, gasoline, naphtha and benzine) creates a serious hazard. In his experience workers, exposed to the solvents in any considerable concentration for a year or so, become gradually incapacitated through destructive processes in the nervous system as well as in the respiratory, circulatory, and gastro-intestinal tracts. He believes that the explanation lies in the dissolving effect upon the fat of the central nervous system and elsewhere. Numerically, in this first group, the substances producing dermatoses are the most important. In Ohio in 1931 of 1,217 compensable diseases reported 833 were cases of dermatitis.

The second group of health-hazards—fatigue—is unquestionably of major importance, but since this group does not lend itself satisfactorily to quantitative measurement it is difficult to assess its value statistically. Hayhurst draws attention to the fact that with respect to the employment of women and children and of pregnant women many of the states fall short of the recommendations of the International Labour Office. No states, for example have legislation meeting the requirement of this Office regarding pregnant women, *viz.*, "A woman is not to be employed in industrial or commercial work for six weeks after confinement; she shall be free to leave such work six weeks before confinement."

The third health-hazard—dust—is a common one. Hoffman's estimation that 13 per cent of workers are subject to dust, gases and fumes in harmful amounts is concurred in. Silica is the outstanding dust in this group. Hayhurst fears that the dust count, while valuable, is often misleading, on account of the fact that the minute uncountable particles do the most damage. If the dust is easily visible and contains more than 25 per cent free silica it may be assumed that the conditions are unsatisfactory.

The final group of industrial health-hazards—air conditions—cause their adverse effects

largely through overheating. The criteria for judging the working atmosphere are, the temperature, the effective temperature, the cooling power of the air, and the radiation effects of surrounding objects. Attention is drawn to the fact that conditions which are satisfactory in winter may not be so in summer, due it is thought to acclimatization, the mechanism of which is obscure.

FRANK G. PEDLEY

Pathology and Experimental Medicine

Peritonitis. Meleney, F. L. *et al.*, *Arch Surg.*, 1932, 25: 709.

In a previous paper which was reviewed in this *Journal* (1931, 24: 731), Meleney and his co-workers presented the bacteriological findings in a series of 106 cases of peritonitis. This extensive study elucidated the fact that when two or more different species of intestinal micro-organisms were present the severity of the clinical course of the disease was intensified. This synergistic effect of bacteria commonly found in peritoneal exudates is studied in the present paper. There are two main bacteriological groups of cases of peritonitis: (1) those that seem to appear spontaneously, which are usually due to the hæmolytic streptococcus or the pneumococcus; (2) those that occur by a spread of organisms from some of the contained viscera, notably the *B. coli,* non-hæmolytic streptococcus and the *C. Welchii.* There seems to be evidence that the infection in peritonitis is due to the organisms habitually present within the intestine, rather than to the introduction of organisms not commonly found there. Both clinical and experimental evidence show that the peritoneum is able to overcome contamination with intestinal organisms, provided that they are not introduced into the peritoneal cavity in too great numbers or at too great a speed, but if such limits are exceeded peritonitis and death may ensue.

Experiments were made with the organisms commonly found in peritoneal exudates, *viz., B. coli, streptococcus viridans* and *C. Welchii,* to determine their synergistic action in producing fatal peritonitis following intraperitoneal infection. These were found to have a synergistic action in producing a lethal infection of the peritoneum. Death occurs following the inoculation of much smaller doses of a combination of two or three of the species than when one form is inoculated in pure culture. The *C. Welchii* is not more active in this synergistic action than the other two. At the time of operation in cases of peritonitis smears and cultures should be made so that there may be a basis for prognosis. If more than one species of intestinal organism is found in the cultures the prognosis is likely to be worse than if any one organism is found in pure culture. In the primary forms of peritonitis usually caused by the hæmolytic streptococcus or the pneumococcus this does not apply. There must be taken into consideration the adjuvant action of one species of intestinal bacteria on the others, as well as the possibility of a toxic substance formed by the synergism of these bacteria, when growing together in mixed cultures, which may not be produced by any of the species in pure cultures.

G. E. LEARMONTH

Gross Cardiac Hypertrophy in Myocardial Infarction. Bartels, E. C. and Smith, H. L., *Am. J. M. Sc.,* 1932, 184: 452.

The authors point out that there is by no means any unanimity of opinion among authorities as to whether myocardial infarction results in hypertrophy of the heart or not. In order to settle this point Bartels and Smith reviewed 8,912 autopsy records from which they culled 42 cases in which there was evidence that the coronary arteries had been diseased sufficiently to produce definite chronic infarction. All cases in which there was hypertension or a history of a blood pressure of more than 150 mm., systolic, and 90, diastolic, were excluded, as were those with a history of any abnormality which might tend to cause cardiac hypertrophy. Such diseases as chronic valvular disease, syphilitic aortitis, congenital heart disease and fibrosis of the lungs were excluded for this reason. In this carefully selected group of 42 cases, the normal weight of the heart was estimated according to the weight of the individual. An error of 8 per cent was allowed. It was found that in only 5 cases was the recorded heart weight within normal limits. In all others it was hypertrophied, the increase in weight varying from 9 to 108 per cent. The average increase in weight for the whole group was 44 per cent. The authors conclude that cardiac infarction is a definite cause of cardiac hypertrophy.

E. S. MILLS

Experimental Œdema Produced by Plasma Protein Depletion. Lepore, M. J., *Arch. Int. M.,* 1932, 50: 488.

This work presents further experimental support of the Starling hypothesis which holds that the exchange of water between the blood and the tissue fluids through the capillary wall is determined by a delicate balance between the hydrostatic pressure in the capillaries and the osmotic pressure of the plasma protein.

The author reviews the literature from the clinical and experimental aspects. It is well established now that the presence of œdema in nephrotic and undernourished patients is definitely associated with low plasma protein colloid osmotic pressures, and low plasma pro-

tein concentrations. Massive œdema has been produced experimentally in dogs by diets deficient in protein and by selective removal of plasma (plasmapheresis). The appearance of œdema in both conditions was found to be directly related to the presence of low serum protein concentrations. It is obvious that if no fluid were available for filtration, œdema could not develop. The earlier investigators failed to take into account the important rôle played by the ingestion of fluid and salt in the development of this type of œdema. Shelburne and Egloff in 1931 confirmed the work of previous investigators, and showed that sodium chloride and sodium bicarbonate increased the œdema of dogs with a constant low level of plasma-protein, while potassium did not. They suggested that given a low plasma-protein the amount of œdema was determined by the quantity of the intake of the sodium ion.

The author performed a carefully controlled study of the water and chloride balances of ten hypoproteinic dogs, supplemented by analyses of the chloride and water content of tissues obtained at autopsy. On the basis of the experiments reported, he found that œdema occurred in the dogs when the serum protein level was about 4 per cent. He distinguished between the effect of rapid and slow plasmapheresis on the blood. Analyses showed that during the first few days, the albumin fraction of the serum was restored more rapidly than the globulin fraction, whereas later the globulin fraction was replaced more rapidly. Analyses of the muscles and skin showed that the œdema was widely distributed, but was more marked in the hind and fore limbs. The œdema involved the visceral organs as well as other tissues. Definite retention of chloride and water were associated with the appearance of œdema. The lowering of the serum protein permits the escape of salt and water whenever the supply of these materials is adequate. The disappearance of the œdema was definitely associated with a rise in the serum proteins, and was accompanied by a diuresis, an increased excretion of chloride and a decreased intake of fluid. There was definite evidence that the chloride excreting power of the œdematous animals was normal. It is suggested that probably a good portion of the chloride gets into the tissues before it can be excreted by the kidneys. It is concluded that the œdema produced in dogs by plasmapheresis is a sodium chloride œdema, the development of which can be hastened by increasing the intake of fluid and sodium chloride of these animals.

These experiments justify the employment of restriction of the fluid and salt of the diet advocated for years in the treatment of œdema in human patients. L. J. ADAMS

Obituaries

Dr. Thomas Henry Blow, one of Calgary's most prominent and highly esteemed citizens died suddenly at Vancouver, B.C., on December 27, 1932, at the age of seventy years.

Doctor Blow was born in South Mountain, Ont., the son of the late Mr. R. H. Blow. He received his preliminary education at the Kemptville, Ont., High School and his medical education at McGill University, where he graduated in 1885. Following his graduation he practised in Denver, Col., and then in South Mountain, where he remained for a number of years. Deciding to take up the study of diseases of the eye, ear, nose and throat, he went to London, England, where he spent two years of earnest work. On his return to Canada he spent a year in practice at Ottawa, and in 1903 came west to Calgary, where until recent years he devoted his abilities to his specialty. He was the first physician in this city to specialize in this branch of medicine in which for many years he had a large practice. As a resident here he always evinced a keen interest in public affairs especially in educational affairs. He was the leading spirit in the organization of what was to have been the University of Calgary, had not the University of Alberta at Edmonton come into existence, when his scheme was abandoned. In 1913 he was elected one of the representatives of Calgary in the Alberta Legislature, and continued in this capacity until the elections of 1923. For some time prior to his death his large property interests engrossed much of his energies, though he found time to travel extensively. A serious cardiac lesion which eventually caused his death forced him to take life easier during the past two years. To his many friends and to his confrères who knew him from his early period of residence here, his passing is a source of deep regret. Possessed of a genial and likeable personality, he drew many to him who always retained a warm personal regard for his fine qualities. He was married on June 18, 1885, to Miss Ida J. Mulholland, of South Mountain, who survives him, together with four children.

G. E. LEARMONTH

Dr. Dorothy Jean Burrows. Following several operations to remove a peanut which lodged in her lung early in September, Dr. Dorothy Jean Burrows, of Harriston, Ont., died on December 7, 1932, in the Toronto General Hospital. The late Dr. Burrows was a graduate in medicine of the University of Toronto (1922), and spent a year in post-graduate work in Philadelphia before practising in Harriston. She was born in Listowel in 1898 and received her early education in Harriston public and high schools. She is survived by her parents and three brothers.

Hon. Dr. John Waterhouse Daniel, died at his home in Saint John, N.B., on January 12, 1933, as a result of complications following an attack of influenza. He was the oldest member of the Canadian Senate and would have been 88 years old if he had lived three weeks longer.

Doctor Daniel was born at St. Stephen, N.B., on January 27, 1845, and graduated in Medicine at the Bellevue Hospital Medical College, New York, in 1865. He was later admitted M.R.C.S. England.

Doctor Daniel had the distinction of winning four contests to the House of Commons in eight years. Contesting St. John-Albert as a Conservative, he won a by-election in 1904. He was re-elected in the general elections later that year, as well as in 1908 and 1911.

After a successful political career, he was summoned to the Senate in 1912. Until he became ill a few days before his death his health had been excellent and he had never missed a session of the Senate. As mayor of Saint John he welcomed the Duke and Duchess of York

to the city, and at the coronation of King George V he was a representative of the Canadian House of Commons.

Doctor Daniel held the rank of surgeon lieutenant-colonel in the New Brunswick artillery. He married Miss Jessie Porteous Ennis in 1890. They had no children. His wife died in 1921.

Dr. Horace Ray Elliott, of Niagara Falls, died on December 19, 1932, after a lengthy illness, in his fifty-second year. He had resided in Niagara Falls for twenty-six years, and was one of the best-known surgeons in the Niagara district. Doctor Elliott took an active part in sports, particularly baseball and hockey. Doctor Elliott was born in Elgin County, and graduated from Woodstock College at the age of 17. He graduated from the University of Toronto in 1902, taking post-graduate courses at the Mayo Clinic at Rochester, Minn., and in London, England. For some years he practised in Edinburgh. Doctor Elliott was a member of the Masonic Lodge in Aylmer, Ont. Surviving are his widow, Mrs. Erma D. Elliott; one sister, Mrs. J. H. Jones, St. Thomas; his father, Mr. H. Elliott, St. Thomas; one brother, Justice Elliott, St. Thomas.

Dr. Andrew Haig, one of the best known physicians in Northumberland County, died at his home in Campbellford, Ont., on December 6, 1932, Doctor Haig was born in 1866, was a graduate of Queen's University (1891) and served for a time on the staff of Belleville Hospital. Besides his widow, he is survived by two sons, McLean, of Regina, and Jack, of Toronto.

Dr. Annie Verth Jones, Cayuga, died early in January, 1933, after a long illness. She was the sixth daughter of the late John and Mrs. Verth, and was educated at York Public School, Caledonia High School and Toronto Normal School. After teaching a few years in Toronto, she entered the University of Toronto Medical School, and graduated in 1896. She married William H. Jones, and practised medicine in Rossland and Nelson, B.C. Ten years ago her health failed, and she returned to Ontario, where she had since lived.

Dr. Guy Filby Palmer, of Ucluclet, B.C., died suddenly at his home on January 4, 1933, He was born in 1862, and was a graduate of McGill in 1885. He is survived by his widow, formerly Norah Palmer and a brother, J. Godfrey Palmer, of Chichester, England.

Dr. Frank Harten Pratten, for the past thirteen years Medical Superintendent of the Queen Alexandra Sanatorium, Byron, Ont., died in London, Ont., on December 10, 1932.

Doctor Pratten was born in Waterford, Ont., the son of the late Mr. and Mrs. George Pratten. He graduated in medicine from the University of Toronto in 1911, from which time until 1914 he was resident physician at the Muskoka Hospital for Consumptives at Gravenhurst. In 1915 he became associated with Dr. J. S. Hart of Parkdale, Toronto, and was on the staff of the Toronto General Hospital. He was a member of the Canadian Army Medical Corps from 1914 to 1918, attaining the rank of Major. He went overseas in 1915, and for some time was in charge of the chest wards at Moore Barracks hospital. After this he served with a front-line unit in France, taking part in the attack on Vimy Ridge. He was returned to England in 1917 to become officer in charge of medicine at the Canadian special hospital, diseases of the chest, at Lenham, Kent. Shortly after demobilization in 1919 he became Medical Superintendent of the Queen Alexandra Sanatorium.

During his superintendency at Byron, he saw the sanatorium develop from an institution of 250 beds to 6,000 beds—the largest single institution of its kind in Canada. He was a Fellow of the American College of Physicians; a Fellow of the Royal College of Physicians (Canada); a member of the Western Ontario Academy of Medicine; the Toronto Academy of Medicine; the Harvey Club; and the Canadian Medical Association.

Aside from Doctor Pratten's medical ability, his outstanding success as an administrator, his great gift of binding together his staff in a spirit of loyalty, his faculty of being able to discern the viewpoint of others and to sympathize with their needs, resulted in the high degree of efficiency for which the sanatorium is noted. Doctor Pratten was a man whose sterling qualities made for him a wide circle of friends among the medical fraternity, directors, staff and patients of the sanatorium, and all with whom he came in contact.

Besides his widow, he is survived by his son, Frank; his daughter, Jane; one sister, Mrs. Herman Woodsworth of Cornwall, N.Y.; two brothers, Ray, of Peterborough, and George, of Windsor. A brother, Waldo, predeceased him.

Dr. Stuart Scott, of Newmarket, Ont., died on January 4, 1933, after completing forty-three years' service as Medical Officer of Health at Newmarket, in his seventy-third year.

A native of Colborne, Doctor Scott was educated at Gananoque, and later graduated from Trinity University (1885). He first practised at Lloydtown, moving to Newmarket in 1889, where he later became a director of the York County Hospital. During the whole of that period he was closely associated with education and was a member of the Newmarket School Board from 1889 to 1926. He was a former president of the York County Medical Society. The newest public school in the town, the Stuart Scott School, was so named in his honour. One son, Douglas, in Toronto, survives him.

Dr. Emily Janet Irvine Smith, widow of County Judge George Smith, died at her home, Windsor, Ont., on December 20, 1932. She had been ill one week of pneumonia. Judge Smith died two years ago. Mrs. Smith was born near Woodstock in 1859, the daughter of John and Emily Irvine, of United Empire Loyalist stock. Her early life was spent in Brampton. She was a pioneer among women medical students at a time when courage was required to go through with such study in the face of public opinion. She received her degree in medicine from the University of Toronto in 1890 and because of her brilliant work in biology and pathology was granted a special degree from Trinity (1891). She practised medicine for a few years in Brampton and Toronto until overtaken by deafness, which handicapped her in her professional work. She had unusual ability in diagnosis and was especially successful with children. In 1893 she married the late Judge Smith, who was at that time a barrister in Woodstock. Her life was full of activity, aiding him in his political career in the House of Commons. In 1912, on his appointment as Judge of the County Court of Essex, they moved to Windsor. She is survived by five brothers; William, Bert, John and Christopher Irvine, of Toronto; Franklin, of Saskatoon; and five sisters.

Dr. William Oliphant Stewart. Guelph lost one of its older medical practitioners in the death, on December 25, 1932, of Dr. W. O. Stewart, who prior to his retirement seven years ago was one of the best-known physicians in this part of western Ontario. Doctor Stewart, who practised in Guelph for a period of 37 years left this city seven years ago to make his home in Lajolla, Cal., owing to his failing health, and only recently returned to Ontario. Just eight days ago, shortly after his return, his wife, formerly Lilla J. Sheppard, died in London, Ont.

A son of the late Alexander Stewart, one of the pioneer residents of Eramosa Township, Doctor Stewart spent the greater part of his life in and around Guelph. Graduating from the University of Toronto in medicine in 1887, Doctor Stewart came to this city and practised continuously until 1925, when he left for the South.

During his long period of residence here he took an active interest in many civic organizations, and was a member of the Guelph School Board for a great many years. He was also honoured with the Chairmanship of the board during his term of office, and for almost thirty years was physician at Ontario Agricultural College and MacDonald Institute. Surviving are: two brothers, Alexander Stewart, Guelph, and Rev. Daniel Stewart, West Palm Beach, Cal.; and one sister, Miss Mary C. Stewart of Guelph.

News Items

British Empire

The Flying Doctor in Australia.—The Australian's own name for the two million square miles of pasture-land which lie in the interior of the continent is the "outback country," and it is an apt description of that isolated district. The fertility of the soil is counter-balanced by the uncertainty of the rainfall, which makes agriculture even more of a gamble than usual; it has attracted few settlers, and these live scattered over the countryside in widely distant farms. One of the greatest disadvantages imposed by such life is the absence of medical skill and advice in times of illness, and the impossibility of speedy and comfortable conveyance of the sick to civilization. Dr. W. D. Walker, in a lecture which he gave at the London School of Hygiene and Tropical Medicine on December 8th, described the work of the Rev. John Flynn, superintendent of the Australian Inland Mission, in organizing medical services for this area. Some 20 years ago Mr. Flynn began to form the chain of 13 hospitals which now have been set up, each with two well-qualified nurses. But it was not till wireless and aviation had developed that Mr. Flynn found the appropriate means whereby adequate medical care may be provided for a scanty population distributed over an immense tract of country. In May, 1928, Dr. K. St. Vincent Welch, the first "flying doctor," set up practice at Cloncurry in Queensland. With his aeroplane he could attend patients within an area of a quarter of a million square miles, and soon wireless transmitters extended the range of his consulting-room to 600 miles. The sets were both simple and efficient; the power for the wireless transmitters was derived from small foot-pedalled generators, and frontier transmitters were set up at isolated places which had no other means of communication. At first home operators had to learn Morse, but recent improvements have now made it possible for messages to be sent in Morse by tapping an automatic typewriter. The operator at the centre translates the message, and the doctor sends his prescription direct by wireless telephone. During the first year of the service Doctor Welch flew 20,000 miles, and attended 255 patients in 26 centres, all without a single mishap. The solid achievement that these figures represent has grown steadily with every year.—*The Lancet*, 1932, 2: 1396.

South African Institute for Medical Research.—The South African Institute for Medical Research, under the direction of Sir Spencer Lister, has an annual budget of £56,000 a year, of which sum, however, over £40,000 is allotted to the routine division. This division, which undertakes pathological investigations of all kinds for many hospitals and public health authorities, occupies a corresponding share of the annual report, full details of the tests made in the seven departments of the main institute and in the branch laboratory of Port Elizabeth being supplied. The ample material to which workers in this department have access provides opportunity for special studies which is evidently not neglected. For example, it is stated that in the pathological department work has been begun on the complications arising from pulmonary root gland infections in cases of infective silicosis of these glands, on the site of the primary lesion in the lung, when one exists, and on the relation between such a lesion and tubercle silicosis and silicosis with overt tuberculosis. It is noted that the incidence of primary carcinoma of the lung among Rand miners does not seem to be greater than that of the remainder of the population. Autopsy records reveal ten cases in a group of 1,600 European miners, in five of which no evidence of silicotic lesions in the lung had been observed; in a control group of 670 European males 5 cases were found, no cases occurring among 293 females coming to autopsy during the same period. Satisfaction is expressed with the results of a polyvalent anti-pneumococcal serum prepared in the institute for which there is apparently a good demand.

The research division contains departments of bacteriology, industrial hygiene, biochemistry, pathology, and entomology. The work recorded includes studies of the bacteriology, immunology, geographical incidence, and epidemiology of pneumonia on the Rand; dusting experiments on guinea-pigs and monkeys, and the elaboration and standardization of methods of dust estimation; the investigation of the diet of mine natives, especially its vitamin A and calcium content; and attempts to influence carcinomatous growths in animals by microörganisms (*Salmonella gallinarum*) cultivated in tumour filtrates. Following the recommendation of Prof. N. J. Swellengrebel, a field station for malaria research has been established at Tzaneen, in the north-eastern Transvaal.—*The Lancet*, 1932, 2: 1397.

Great Britain

"Vermeer the Magical."—On December 1, 1932, at the Princess Elizabeth of York (formerly the East London) Hospital for Children, Shadwell, London, E., Dr. H. Morley Fletcher, F.R.C.P., Consulting Physician to the Hospital, took the Chair for a lantern-lecture on "Vermeer the Magical," by Mr. E. V. Lucas, man of letters, humorist, and chairman of the publishing house of Methuen and Company, Limited. The large audience, consisting of members of the honorary, resident and nursing staffs, and of visitors from several of the London hospitals, found difficulty in deciding what to admire more, the wealth and beauty of the lantern slides or the peculiar charm of the lecturer's low, drawling voice and his exquisite command of language, at once rich, tender, and drily humorous.

Vermeer had many children, probably eight; and eight children "can make quite a substantial income look very foolish," but his paintings suggest prosperity and aristocracy. Less than 40 of these are known, and they are scattered all over the world. Where are the rest?

Mr. Lucas showed among others slides of Vermeer's self-portrait at Vienna, in which he turns his back to the world; of the "Young Courtesan" at Dresden; of the "View of Delft"; of the "Head of a Young Girl," ("the most beautiful thing in Holland"); and of the "Pearl Necklace" at Berlin. The white wall in this picture, the lecturer said, is beautiful beyond the power of words to express. It is so wonderful that if one were to cut out a few square inches of this wall alone and frame them, one would have a joy for ever.

Prof. Leonard Findlay, M.D., in fluent and graceful terms, proposed a vote of thanks to Mr. E. V. Lucas. This was carried with acclamation.

Antivivisection Petition.—In the House of Commons on December 20th, Mr. Lansbury, Leader of the Opposition, presented a petition signed by 5,684 persons stating that they believed vivisection to be morally

unjustifiable, useless, dangerous, and demoralizing to the community, and earnestly praying the House to pass a Bill withdrawing the sanction of the law from the practice.

New Year's Honours.—The list of honours published at the New Year contains, among others, the following names of members of the medical profession:—

Baron.—Sir Thomas Jeeves Horder, Bt., K.C.V.O., F.R.C.P.

K.C.I.E.—Major-General John Wallace Dick Megaw, C.I.E., M.B., K.H.P.

K.C.V.O.—Frederic Jenne Willans, C.V.O., M.R.C.S., [illegible] H.M. household at Sandringham.

[illegible] — John Lawrence McKelvey, F.R.A.C.S., Surgeon to the Royal Prince Alfred Hospital, Sydney, N.S.W. San Crombie Po, C.B.E., M.D., Medical practitioner and municipal commissioner, Bassein, Burma.

Alberta

The annual meeting of the Alberta Hospital Association was held in Calgary on November 18 and 19, 1932. The president, Dr. R. T. Washburn, of Edmonton, was chairman during the sessions, all of which were held in the Holy Cross Hospital. This was the first meeting of this Association since 1930, as the 1931 meeting was cancelled.

An address of welcome to the visiting members was given by the Mayor of Calgary, Mr. Andy Davison. Addresses of much interest were given by Dr. Malcolm T. MacEachern, Director of Hospital Activities for the American College of Surgeons, on "The operation of hospitals under present conditions," by Dr. Harvey Agnew, Secretary Department of Hospital Service for the Canadian Medical Association on "The Weir report on the nursing profession," and Dr. M. W. Bow, Deputy Minister of Health, Province of Alberta, whose address was on "Maternal mortality in the Province of Alberta."

As in the past few years Round Table discussions took place. These were conducted by Drs. G. Harvey Agnew, Malcolm T. MacEachern and G. F. Stephens, Superintendent of the Winnipeg General Hospital. The subject of health insurance was one of the chief topics for discussion. A plan was endorsed by this Association, whereby a fund would be created similar to an unemployment insurance scheme, to provide for hospitalization rather than make the hospital furnish treatment free. The question was also discussed of what to do with the hired man on the farm or single men who do not pay any taxes, should either class require hospital care, and how this could be done without a loss to the hospital. As a means to overcome this, a motion was passed, requesting that a head-tax be enacted, to be collected by the employer and sent to a central fund at Edmonton, from which hospitalization would be paid for. It was also suggested that a form be printed and given to the man which would show the employer whether the man had paid for treatment, and, if not, authorizing the employer to collect the money.

The ownership of roentgen-ray plates after they have been taken was a subject which received serious consideration. The meeting was of the opinion that a roentgen-ray plate was part of an examination, and the patient who paid for such an examination paid for the report and not for the plate. The plate should remain in the possession of the hospital in the interests of the patient for future reference.

There was a long debate on a regulation that a three months' stay in a community constituted a residence. It was proposed, that this period should be extended to a period of one year, before anyone might be declared a resident. This did not meet with the approval of the majority present.

Many pertinent subjects were dealt with at the Round Table Discussions, which included such questions as "How can the small hospital without a pathologist in the community meet the requirements for approval?" "What is the ruling in Alberta as to the length of time gross pathological specimens should be kept?" "Should hospitals, having in mind general business principles, operate with a maximum or minimum business staff, and if the latter how can this be most effectively carried out?" "Are instruments, gloves, etc., supplied by the hospital for the use of the surgeon in the operating room? and, if so, should a charge be made to the surgeon for the use of the operating room?" General discussion and suggestions for effecting economies on food, medical and surgical supplies, cleaning, service, laundry, etc.

Mr. W. B. Milne, Supervisor of Hospitals, Department of Public Health, Province of Alberta, presented the question of a grant by municipalities to hospitals to replace the present liability of municipalities for hospitalization of indigent sick residents. Other subjects of interest were "Are the smaller hospitals justified in permitting major surgical procedures to be carried out?" "How can closer and more equitable relationships be formed between the smaller and not so well equipped hospitals which have formed contracts and the larger city hospitals which must inevitably take care of the major cases?" "Cannot the smaller hospitals do more to function as health centres?"

The following officers were elected for the ensuing year: *President*, Dr. A. T. Anderson; Superintendent of the Alexandra Hospital, Edmonton; *Vice-president*, Father W. E. Cameron; *Secretary-treasurer*, Mr. Thomas Cox, Edmonton. On the executive are Drs. A. E. Archer and R. T. Washburn.

British Columbia

The Provincial Board of Health has issued a circular letter to the profession, on the subject of trachoma. A recent survey by Doctor Wall, of the Department of Indian Affairs, has shown that the disorder is very prevalent among the Indians of the province, particularly in the interior. Some cases among white children of eastern European extraction were found, and, as was to be expected, advanced cases were found among the Chinese. It is hoped that Health Officers and school physicians will be on the alert, in order that suitable treatment and prophylaxis may be instituted, and, above all, that sources of contagion may be traced.

In conformity with the national committee which is now making a study of nursing problems in Canada, a provincial committee, representing the nursing and medical professions and the Hospital Association, has been appointed to study local conditions. With the avowed intention of bridging the gap between the sick and the trained nurse, of bringing skilled nursing care to those in need of it, at a cost within their means to pay, and in keeping with the economic needs of a dignified profession, their task at the present time appears monumental.

C. H. BASTIN

"1933 will be a memorable year to us as medical men practising in British Columbia, in one respect at least. For this year, beginning with January 1st, the medical profession of British Columbia sets out on a new course. Following the example of our sister province, Alberta, the British Columbia Medical Council is absorbing the duties of the British Columbia Medical Association (the word amalgamation is a misnomer in this respect) and is becoming the main body of organized medicine in the province, assuming all the duties that are concerned with medical practice, except education and

social duties, which will still be performed by a somewhat reconstructed British Columbia Medical Association. This is an important move, and has certain implications which it behooves us all to consider. The move has not been a sudden or impulsive one—it has been taken after a long period of careful thought and consideration. We believe that it is entirely a move in the right direction, and that eventually it will mean a great deal to every medical man in the province. In the first place, it will unify medical organization and eliminate a great deal of over-lapping and waste effort. It has always seemed rather absurd that there should be two provincial organizations, with our comparatively small medical population, yet, as things stood, it was unavoidable. The British Columbia Medical Council is a statutory body, with definite powers, but limited scope of action —the British Columbia Medical Association had a wide scope of action, but no power, and its membership was voluntary and limited. There are too many organizations nowadays, and we believe that any step which simplifies things well make for economy and efficiency. Again, this move is, in our opinion, a right one for another reason. Nobody will deny that medical organization in some form is necessary to protect our interests and to speak for the whole profession. This however entails expense, which, in the past, has been met by the fees paid by the members of the British Columbia Medical Association. These members paid too much, and they paid for others who for one reason or another failed to join the Association, yet benefited by its work. It is infinitely fairer to spread these costs over the whole profession. It will, too, be very much cheaper, and this is a consideration in these days."—*Bull. Vancouver Med. Ass.*, 1933, 9: 63.

Manitoba

At a regular meeting of the Winnipeg Medical Society the following resolution was passed with only one dissenting vote:

> "Therefore, be it resolved that medical attention should be supplied on the same basis as the necessities of life, and therefore not solely at the expense of those citizens who supply medical attention, namely the medical practitioners."

Following the passage of the resolution a representative committee was appointed to consider ways and means of improving the situation of medical men called on to attend patients on relief. Representatives of the Manitoba Medical Association were appointed a few days later, so that the committee represented the whole province. Out of a population of about 215,000 in Winnipeg proper, at least 36,000 persons are now in receipt of relief, which includes food, clothing, rent and fuel, but makes no provision for medical services. Single men in large numbers have been sent out to farms, but again no provision is made for payment of medical services which these men may require.

Sub-committees from the large committee interviewed Winnipeg relief authorities, hospital superintendents, the committee dealing with single men, and a committee which included representatives of the Dominion Government, the Provincial Government and Greater Winnipeg municipalities. In order to secure information as to the amount of medical care supplied to those on relief, and also to those not on relief but unable to pay, a questionnaire was sent out to all practitioners in the province asking that a careful record be kept for a week. The answers to this questionnaire are now being tabulated. The executive committee prepared a series of articles setting forth the doctor's view of the situation, and these articles were published in the daily press. Information and cooperation were sought from the other western provinces and from Ontario. The executive committee also waited on Hon. T. G. Murphy, Minister of the Interior.

The committee reported progress to a meeting of the medical practitioners of Greater Winnipeg on December 16th. A resolution was passed accepting the interim report and expressing appreciation of the work of the committee.

A request has been sent to the Premier asking that a delegation of Manitoba practitioners be allowed to present their views at a meeting of the cabinet.

Though it is doubtful whether, in view of the present financial situation, any monetary assistance from municipalities, provincial or federal governments will be granted to doctors who supply medical care to patients on relief, the invidious position of the doctors is recognized in some quarters at least and the agitation may be regarded as having at least an educational value. Public officials are coming to recognize that there is a problem of medical economics and the general public is beginning to realize the enormous amount of free medical service rendered by doctors.

The regular clinical luncheon meeting of the staff of the Winnipeg General Hospital was the occasion of a pleasant ceremony which marked the retirement under the age-limit of Dr. J. E. Lehmann, after twenty-five years of service on the staff of the hospital. Dr. Charles Hunter referred to long and intimate association between himself and Doctor Lehmann, both in Germany, England and Winnipeg, and at the close of his address presented Doctor Lehmann with a case of pipes on behalf of the honorary attending staff. Doctor Lehmann made a fitting reply.

The Sanatorium Board of Manitoba experiences the pinch of present financial conditions, and will probably be obliged, with regret, to curtail some services. The staff has already taken one wage-cut and has voluntarily offered to accept another in order to maintain present services if at all possible.

Dr. M. R. MacCharles has been appointed for one year director of the recently formed tumour service at the Winnipeg General Hospital.

The vital statistics for the City of Winnipeg for 1932 have just been released. There were 4,327 births and 1,835 deaths. The infant mortality, 45 per thousand live-births, is the lowest on record for the city.

ROSS MITCHELL

New Brunswick

The committee on Nursing Education for New Brunswick has recently been completed. This committee will consider all problems on nursing education arising out of the recent convention of the Canadian Nurses Association held in Saint John. The Committee for New Brunswick consists of: Drs. W. E. Rowley, J. M. Barry and J. B. McKenzie, representing the New Brunswick Medical Association, Miss J. M. McMaster, Moncton, representing the New Brunswick Association of Registered Nurses, Miss Winnifred Dawson, representing the Victorian Order of Nurses, Miss Mabel McMullin, representing the Private Duty Section, Miss Murdoch, of Saint John, representing the Nursing Education Section of the Provincial Order of Nurses, Dr. S. R. D. Hewitt, Mr. Stanley Granville, Mr. A. C. Chapman, representing the New Brunswick Hospital Association, Sister Camilus, representing the Maritime Hospital Association, Dr. A. S. McFarlane, representing the Department of Education.

The Saint John Tuberculosis Hospital reports that for the year ending November 30, 1932, the average occupancy was 98.6 per cent of capacity. Records

showed a total of 74,362 patient days, which is a new high mark.

For the year 1933, the Commissioners of the Saint John General Hospital have made additional appointments to their dental service. These include Dr. F. C. Bonnell as chief dental surgeon. Associated with him are Drs. J. B. Gosnell, R. S. Langstroth, and R. H. Kee. The dental department of the hospital has shown a remarkable growth in attendance since its foundation a few years ago, and has proved a boon to the general medical service in handling dental complications which arise in general medicine. The close association of the dental with the medical service has been a great aid in cases where focal infection has been a feature.

Dr. F. R. Connell, of Saint John, has been appointed as a junior anæsthetist in the Saint John General Hospital.

Dr. A. R. Landry, of Moncton, appeared before a group of medical men in Saint John recently to give an address on anaphylaxis.

Dr. E. T. Kennedy, of Sussex, has been confined to his home for a short while, suffering from pneumonia. His convalescence at present is satisfactory.

A. STANLEY KIRKLAND

Nova Scotia

The Junior Service League of Halifax deserves high praise for its generosity. At a recent meeting of the group a sum of $1,000 was voted to the Halifax Community Chest and a similar sum was given to the Immunization Clinic of Dalhousie University. This Clinic will be concerned with the stamping out of such diseases as diphtheria, small-pox, scarlet-fever and other infectious diseases. Preventive medicine will play a large part in the program which is under the able supervision of Dr. H. G. Grant, Dean of the Medical School and Professor of Public Health. This work should prove highly successful. The members of the City Health Board are very much in favour of this project.

On New Year's day the local press carried a somewhat extensive summary by the Honourable Dr. G. H. Murphy, Minister of Health for the province, of the progress in matters of public health carried out during the past year. The aims of the department, it was pointed out to the public, were twofold: cure and prevention of diseases, and the importance of prevention was emphasized. Particular stress was laid on the ravages of tuberculosis. In this connection it was mentioned that the number of beds now available per 100,000 of population totalled 106, the highest figures for Canada; and that the death rate had diminished more in Nova Scotia than in any other province in Canada. Further, the establishment of a cancer clinic in the province is being studied by a special committee of medical men who will have the facilities of the provincial laboratory were all tissues will be examined.

At a recent meeting of the Senate of Dalhousie University, Dr. H. B. Atlee, Professor of Gynæcology, was elected as the University representative on the Dominion Medical Council to succeed Dr. John Stewart who has retired.

The preliminary report on the results of the medical examination of Dalhousie University students makes interesting reading. The number examined totalled 927. The following notes should be of interest to medical men: 17.7 per cent had scarlet fever; 9.8 per cent complained of frequent sore throat; 9 per cent complained of frequent colds; 44.3 per cent were wearing glasses, yet the figure for abnormal vision is 36.2 per cent!

More remarkable is the fact that 49.6 per cent had had their tonsils removed, and of the rest 18.6 per cent, showed pathological conditions of the tonsils, the men showing a somewhat higher percentage than the women. There are other important items, such as abnormal heart and pulmonary conditions, but these have not yet been fully worked out. The general development was fair in 11.4 per cent and poor in 2 per cent. A full report will be issued later.

N. B. DREYER

Ontario

We are interested to learn that the Middlesex County Medical Association has undertaken to compile a medical history of the County of Middlesex. Physicians in different parts of the county have undertaken to secure information regarding the doctors who have preceded them.

The registered nurses in Toronto and surrounding district have agreed that nurses' fees shall be reduced at the beginning of the year 1933. Where the rates were $6.00 for a twelve-hour day, and $7.00 for twenty hours, they will now be $5.00 for day or night service and $6.00 for twenty-hour service. This applies only to nurses doing private nursing duty.

In the report presented to the Board of Health, Toronto, in December, Doctor Jackson stated that the campaign against diphtheria had been followed by a reduction of 75 per cent in the death rate from that disease in the past two years.

At the annual meeting of the Toronto Hospital for Incurables, it was suggested by His Excellency, the Governor-General, that the Board consider a change in the name of the institution.

J. H. ELLIOTT

Quebec

Dr. A. Lessard, head of the Provincial Health Department, states that children, aged ten or under, to the number of 116,385, have been inoculated against diphtheria by provincial health officials in the districts covered by 26 health units, out of a total of 205,591 children in the areas.

Nearly 50 per cent of the children were inoculated during 1932. Last year's percentage was 33.2 as compared to 56.8 per cent in 1932.

In counties that are served by health units, 135 children died from diphtheria in 1929, out of a total of 814,915 children. After inoculation was started the number of deaths gradually decreased, and in 1931 only 64 died from diphtheria, out of a total of 825,225 children. The percentage dropped from 16.8 to 7.9 per 100,000. In the other counties, and outside the five big cities of the province, the figure per 100,000 increased from 13.8 to 15.3 per 100,000 during the same period. In cities and towns the figure per 100,000 dropped from 13.6 to 7.7 in the 1929-1931 period, stated Doctor Lessard.

For the first time in many years cases of tuberculosis reported to the city health department of Montreal have not shown an increase. In the ten-month period from January to October 31 this year the number of reported cases was 1,825, exactly the same as the number reported at the same date in 1931.

Contagious diseases in general show a marked decline, the total for 1932 being 1,300 fewer than in the corresponding period last year.

Following are the figures for the various categories:

Diseases	1932	1931
Diphtheria	510	557
Scarlet fever	1,527	1,298
Measles	3,567	6,407
German measles	87	96
Whooping cough	1,552	741
Mumps	1,854	406
Chicken pox	1,396	1,793
Smallpox	none	none
Erysipelas	193	153
Typhoid fever	157	115
Cerebrospinal meningitis	6	6
Poliomyelitis	72	682
Septicemia	34	25
Ophthalmia	8	14
Totals	10,963	12,293

Infant mortality has diminished from 116.5 per 1,000 births in 1931 to 101.2 in 1932, it is revealed in a report given out by Dr. S. Boucher, covering the first 10 months of both years. In 1931 there were 2,009 infant deaths to the end of October while this year the number stands at 1,721, a decrease of 288.

Deaths from all causes were reduced from 1,550 in September and October 1931, to 1,459 in 1932, the percentage based on 100,000 of population dropping from 1,136.1 in 1931 to 1,044.1 in 1932.

Accidental deaths showed a small drop this year, the two months for which figures are available giving 69 for 1931 and 68 for 1932.

The new wing of the Notre-Dame Hospital of Montreal was inaugurated on December 8, 1932. The chief address at the official ceremony was given by the Hon. L. A. David, Provincial Secretary, who remarked that fifty years of operation of the Notre-Dame Hospital had placed that institution among the leading hospitals of Canada and had resulted in the organization of many modern medical departments.

Costing about $900,000, the latest addition gives the institution 200 more beds, and houses one of the most elaborate and expensive x-ray departments.

Mayor Fernand Rinfret, Col. Herbert Molson, Mgr. E. A. Deschamps, Hon. Hector Laferte, Minister of Colonization, Game and Fisheries; Dr. Gaspard Fauteux, M.L.A.; Louis Marchal, acting French consul; Hon. Wesley Frost, American consul-general; and Dr. Louis de L. Harwood, president of the board of directors and Dean of the Faculty of Medicine of the University of Montreal, were the other speakers.

General

The American College of Physicians.—Officers 1932-1933: *President*, Francis M. Pottenger, Monrovia, Calif.; *President-Elect*, George Morris Piersol, Philadelphia, Pa.; *First Vice-President*, Maurice C. Pincoffs, Baltimore, Md.; *Second Vice-President*, Charles G. Jennings, Detroit, Mich.; *Third Vice-President*, Noble Wiley Jones, Portland, Ore.; *Treasurer*, William D. Stroud, Philadelphia, Pa.; *Secretary-General*, William Gerry Morgan, Washington, D.C.

The Seventeenth Annual Clinical Session of the American College of Physicians is being held in Montreal, from February 6 to 10, 1933. This is the first time that this important body has met on Canadian soil. The headquarters are at the Windsor Hotel. The following named constitute the local Committee on Arrangements: Jonathan C. Meakins, *Chairman*, C. F. Martin, J. E. Dubé, A. T. Henderson, D. S. Lewis, C. F. Moffatt, C. G. Sutherland, E. P. Benoit, R. H. M. Hardisty, Joseph Kaufmann, E. H. Mason, I. M. Rabinowitch, H. P. Wright.

Addresses of welcome will be given by the Hon. L. A. Taschereau, K.C., Premier of the Province of Quebec; the Hon. Fernand Rinfret, Mayor, City of Montreal; Charles F. Martin, Dean, Faculty of Medicine, McGill University; L. de L. Harwood, Dean, Faculté de Médecine, Université de Montréal; and responded to by F. M. Pottenger, President of the American College of Physicians.

Full advantage has been taken of the excellent facilities for clinical teaching which are afforded by the hospitals attached to the two medical schools in Montreal. It has been found possible to provide ample accommodation for the Clinical Session in eight places which are practically all within a short distance of the headquarters. They consist of four large general hospitals, two pædiatric hospitals, and the Biological Building, Pathological Institute, and Medical Building of McGill University. Daily bedside and theatre clinics have been arranged in all of these hospitals and demonstrations in the university buildings.

Many clinics have been arranged in cardiovascular, gastro-intestinal, pulmonary, and blood diseases, as well as diseases of the duetless glands and of metabolism.

There will he clinieal symposia on diseases of the biliary passages, diabetes, goitre, collapse therapy in pulmonary tuberculosis, syphilitic cardiovascular disease, nephritis, and essential hypertension.

In addition to the small bedside clinies, larger ward clinics have been arranged by the Senior Members of the Staff at the Montreal General Hospital. At the Royal Victoria Hospital one ward has been set aside each day for the demonstration of interesting cases.

At the Annual Convocation, held on February 8th, Dr. F. M. Pottenger, of Monrovia, Cal., will give the Presidential Address and an address will also be given by Sir Andrew MacPhail, of Montreal, on "The Source of Modern Medicine."

A very comprehensive and important program of papers has been prepared. More than one hundred of those who will give papers or conduct clinics are Canadians. One of the distinguished guests will be Prof. E. Rist, of Paris.

A Memorial to Forlanini.—At the two Conferences of the International Union against Tubereulosis held in Rome in 1928 and in Oslo in 1930, it was deeided to open in all countries a subscription on behalf of a monument to the memory of Forlanini.

The inventor of artificial pneumothorax not only endowed medicine with the first really active and efficient method for the cure of tubereulosis, but his discovery paved the way to all the collapse-therapy methods with which medicine is to-day fully armed to overcome this disease. Many patients and physicians in Canada will, possibly, be anxious to show their gratitude to this illustrious son of Italy. Through the most modest donation as well as by means of a larger contribution, it is hoped that they will join in the subscription which the Canadian Tubereulosis Association has agreed to collect on behalf of those in Canada who are interested.

The Ninth Earl of Dalhousie.—A bust of the late George Ramsay, ninth Earl of Dalhousie and founder of Dalhousie University, Halifax, N.S., stands on a pedestal in the Macdonald Memorial Library Building. It is a gift from Dougald Macgillivray, retired Halifax investment banker and staunch friend of the university.

Larger than life-size, the bust was designed and wrought by Massey Rhind, A.R.S.A., a native of Edinburgh, who spends his summers at Chester, N.S. Mr. Rhind is the sculptor of a number of Nova Scotia works of art, including several war memorials. In his study for the Dalhousie bust, the sculptor had access to all the original memorials at the family seat in Edinburgh where there hangs a full length portrait of Dalhousie as captain of the King's Bodyguard of Royal Archers,

etiology of varicose veins and kindred lesions." The portion on Anatomy is most valuable. Particular attention is paid to situation of the valves and also to communications between the deep and superficial systems. The relation of both of the above to the direction of blood flow is fully and clearly discussed. The chapter on Physiology, in only a few pages, covers very fully the very complicated questions of capillary and hydrostatic pressure, the effect of muscular action on the blood flow, and the adaptability of the circulation to changes in position.

As regards the etiology of varicose veins, it is shown that "the lesion is not due to insufficiency of the valves of the main stem, but starts presumably at the inlet of the communications into a side branch or into the main stem." An infectious or toxic origin is considered as an etiological factor. Complications, sequelæ and allied conditions of infrequent origin are discussed. Many valuable points in examination and techniques are given. The section devoted to hæmorrhoids is probably less valuable than the foregoing portions of the book.

The breadth of view of the author is apparent throughout and might be copied by others with profit. In the introduction he states "It may be that on some points my findings will prove erroneous. If so, their significance will be limited to the event of having raised the respective questions. Others will then have to work out their solution."

This book is of theoretical interest and practical value, especially to those treating varicose veins who wish more enlightenment than is given in many of the books on this subject.

Non-Tropical Sprue. A Study in Idiopathic Steatorrhœa. Th. E. Hess Thaysen, M.D., Senior Physician to the St. Elizabeth's Hospital, Copenhagen. 257 pages, illustrated. Price, Cloth $3.75; paper $3.25. Oxford University Press, London; McAinsh & Co., Toronto, 1932.

This monograph is devoted to a subject about which much has been written in recent years. In spite of its prominence in recent medical publications, the disease is seldom recognized in temperate climates, though the tropical form is endemic in many countries. Thaysen has drawn from his own rich clinical experience, supplemented this with available literature on the subject, and produced a monograph which spans a recognized gap in medical literature. He has discussed all aspects of the disease, devoting chapters to the etiology, pathology and various clinical manifestations. The close association of Gee-Herter's disease (cœliac disease, intestinal infantilism) with both tropical and non-tropical forms of sprue is emphasized, and evidence is arrayed in support of the contention that all three diseases are closely related, if not actually identical. The book is complete with case records, bibliography, and a well compiled index. It is amply supplied with charts, tables and excellent illustrations.

In completeness, in orderly presentation, and especially in lucidity of expression, this monograph is an outstanding achievement. It cannot be recommended too highly.

Medicinal and Poisonous Plants of Southern Africa. John Mitchell Watt, M.B., Ch.B. (Edin.), Professor of Pharmacology, and Maria Gerdina Breyer-Brandwijk, Phil. doct. (Utrecht), Apothecary (Utrecht), formerly Junior Lecturer in Pharmacology, University of Witwatersrand, Johannesburg. 314 pages, illustrated. Price $7.50. E. & S. Livingstone, Edinburgh; Macmillan Co. of Canada, Toronto, 1932.

"Most of the best books on Botany and Zoology are of Victorian or earlier date, out of print, and becoming scarcer every year."* In view of this pronouncement, the reviewer hesitates to praise the work, the title of which appears above. Nevertheless, he ventures to believe that something may be said for it. In the first place, it has called for an immense amount of labour in collecting the raw data, which include the aboriginal names for a great number of African plants, together with the putative remedial value in the opinion of the natives. It is, of course, no final argument for the medicinal value of any of these plants that they are so judged by natives, but the inclusion of such information is of the highest importance from the ethnological standpoint. Africa is, of course, a great storehouse of such information and those who dig it out, in whatever field of thought, are doing a service.

The general treatment of the work follows the taxonomic order, beginning with the Taxaceæ but not ending with the Compositæ, as the chapters following deal with the Algæ, Fungi, Ferns, the Horse-tails and the Club-mosses. Each chapter is supplied with its own bibliography, and the book as a whole is made most useful by the inclusion of three indexes—of names in English and Afrikaan, of native names, and of active principles. The illustrations include 12 full-page coloured plates done with exceptional skill on the part of both artist and printer. Indeed the press work is so excellent that one wonders why money should be wasted in this way rather than in the preparation of advertisements for lipstick or cigarettes. So much more could be done than is the case at present in the matter of scientific illustration, if science paid better.

The book will be of interest and use to pharmacologists in their search for the raw materials of unknown or little-known drugs. Judging from the text, they will be doomed to a good deal of disappointment, but of course no field of research yields only positive conclusions. To the botanist the book will be valuable in that it brings to him a large amount of information in which he will be interested, because from the botanical point of view Africa is not generally well-known, and because it has an extraordinary richness of material as yet only very imperfectly known.

Organic Chemistry for Medical Students. George Barger, M.A., D.Sc., F.R.S., M.D., Professor of Chemistry in Relation to Medicine in the University of Edinburgh. 252 pages. Price 12/6. Gurney & Jackson, London, 1932.

This book, which is a reincarnation of Sir James Walker's well-known text, is an excellent example of its class. As compared with organic chemistry text-books of similar size and scope, but not designed especially for medical students, it deals more extensively with naturally-occurring compounds and their simpler analogues, and less with substances of purely theoretical or technical importance, such as dyes. Paragraphs are interspersed indicating connections with the medical sciences, such, for example, as those which deal with anæsthesia, fermentation, respiratory quotient. The discussions of proteins, enzymes, alkaloids, hæmoglobin, carotene are too brief to be more than an introduction to fuller discussion in courses of biochemistry or pharmacology. The book is almost wholly descriptive; little attempt is made to develop general principles or theoretical ideas, and no bridges are built backwards to general or physical chemistry. In some places, as in the discussion of stereoisomerism, the author appears to assume a rather thorough preliminary grounding in physics and chemistry. But the book is written with admirable clarity and conciseness and should find a wide field of usefulness. It is strikingly up-to-date, and the author's name is a guarantee of accuracy, though exception might be taken to the statement that hexose-phosphate is *the*

* From a recent catalogue of books issued by a bookseller in the North of England.

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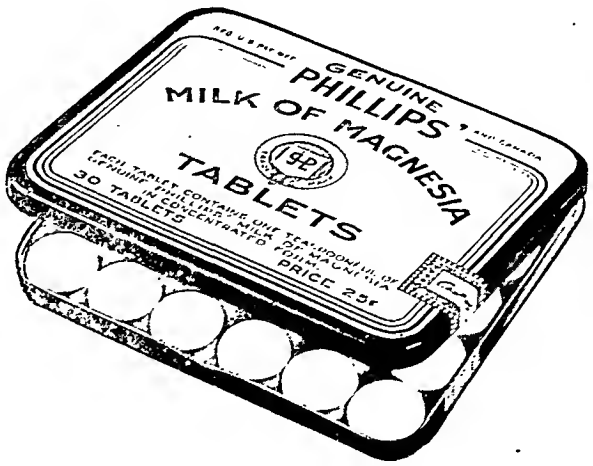

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2. There are no so-ealled standards or popular sehedu that she should aecept as "normal or average."
3. Neither such schedules nor the adviee of friends family is a fair substitute. Only a direct study of ea baby's individual diet requirements—made by the bab personal physician—should determine the feeding sehedul

No Gerber advertisement ever earries feeding tables or feedi formulas. Every Gerber advertisement, and the label on eve Gerber can, urges the mother to rely only on her physician a to follow only his adviee as to when, how mueh, and what s should feed her own individual baby.

Send for Sample

Our new Cereal produet has reeeived a gratifying reeeptio If you have not already examined a sample of Gerber's Strain Cereal, we will gladly send you one.
Just fill out eoupon below and mail.

ACCEPTED AMERICAN MEDICAL ASSN.

FINE FOODS OF CANADA LIMITED

PACKERS OF NATIONALLY DISTRIBUTED F For C To *FINEST QUALITY FOOD PRODUCTS*

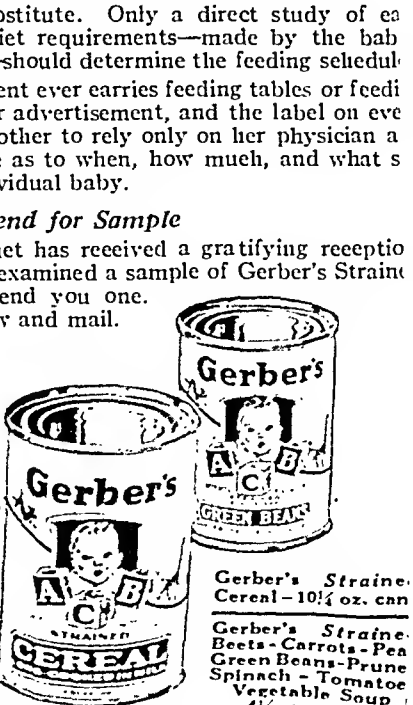
WINDSOR ONTARIO

FINE FOODS OF CANADA, LTD., Windsor, Ont., Can.

You may send me a sample of Gerber's Strained Cereal—also analysis and description of the product as filed for acceptance with the Foods Committee of the American Medical Association.

Name .....

Address .....

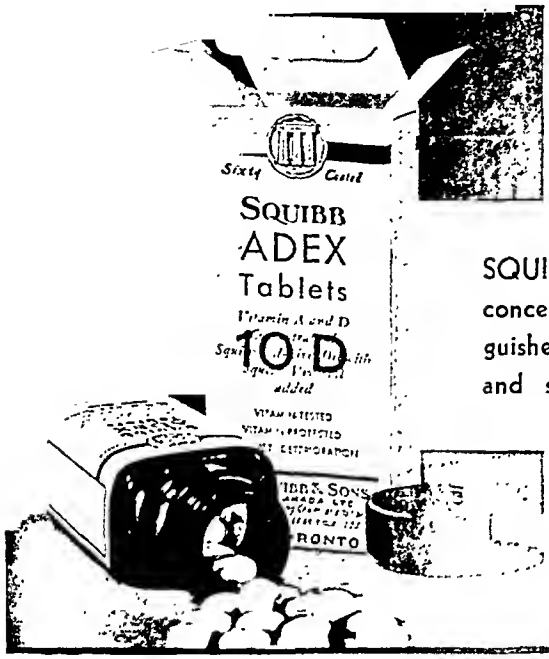


Gerber's *Strained* Cereal—10¼ oz. can

Gerber's *Strained* Beets - Carrots - Peas Green Beans - Prunes Spinach - Tomatoes Vegetable Soup 4½ oz. cans

15c at Grocers and Druggists

assimilable concentrate!



SQUIBB ADEX TABLETS-10 D . . . a superior concentrate of cod-liver oil vitamins, distinguished for its high potency, assimilability, and stable vitamin content!

Samples of Adex tablets-10D will be sent to physicians upon request.
Addresss E. R. Squibb & Sons of Canada Ltd., 36-48 Caledonia Road, Toronto.

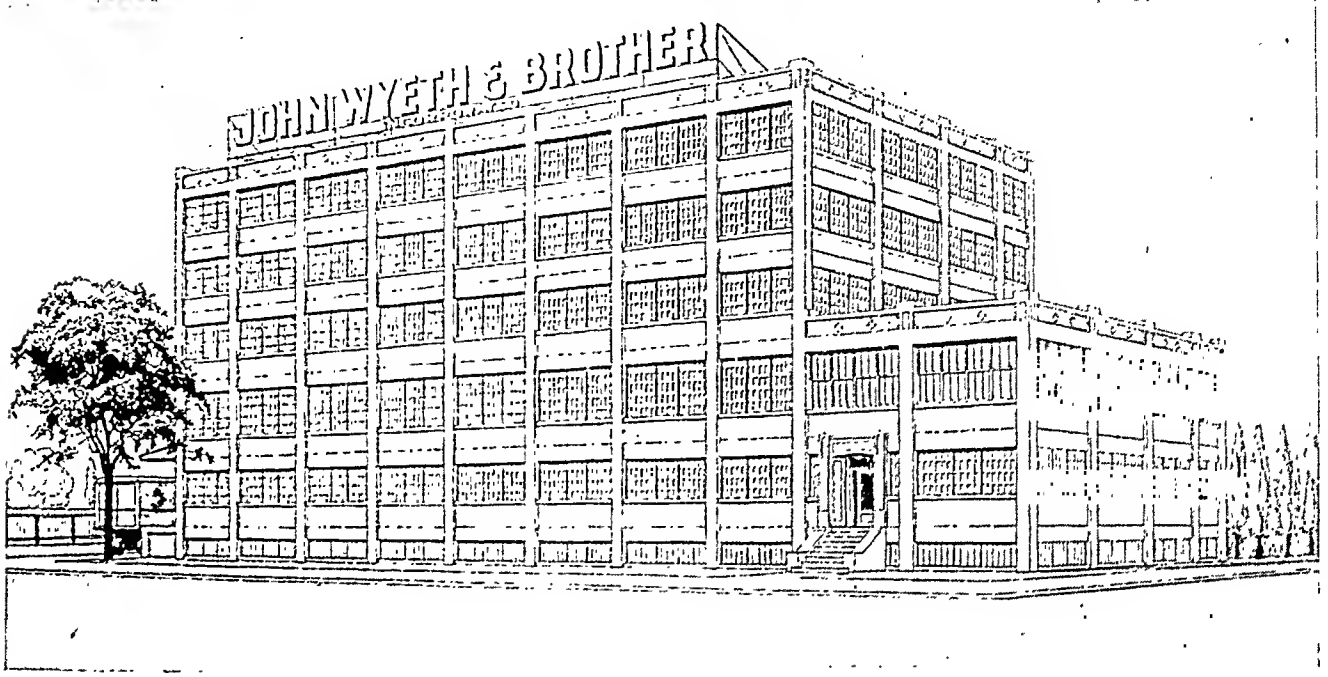
Physicians! Note the four-fold control of vitamin potency

Physiological tests prove that Squibb Adex Tablets-10 D retain their high potency indefinitely and are thoroughly assimilable. The following method enables Squibb to *guarantee* a potency of not less than 1,000 U.S.P. units of Vitamin A and not less than 245 Steenbock units of Vitamin D with every tablet.

1. The oil from which the concentrate is made is physiologically tested. 2. The concentrate is tested before incorporation into the tablet. 3. The tablets themselves are physiologically tested by adding them directly to the vitamin-free ration of animals. 4. Tested manufacturing and packaging processes ensure their stability.

ADEX Tablets-10 D

FIFTIETH ANNIVERSARY



Commemorating 50 Years of Continuous Operation in Canada

JOHN WYETH & BROTHER

announce the removal of their laboratories to new and more extensive premises.

The headquarters of the new plant is in Walkerville, Ontario. The construction is modern throughout—ideally adapted for modern manufacturing pharmacy—equipped with the most efficient, up-to-date machinery.

Lyman's, Ltd. will continue to act as wholesale distributors for Eastern Ontario, Quebec, the Maritime Provinces and Newfoundland. Orders from Central and Western Ontario, the Midwest Provinces and British Columbia will be shipped from the home office in Walkerville.

We wish to express our thanks to our many friends in the Dominion whose loyal support has made this noteworthy expansion possible, and we look forward to a continuance of friendly relations and mutual cooperation with our medical and pharmaceutical clientele.

JOHN WYETH & BROTHER, INC.

Walkerville, Ontario

Pharmaceuticals

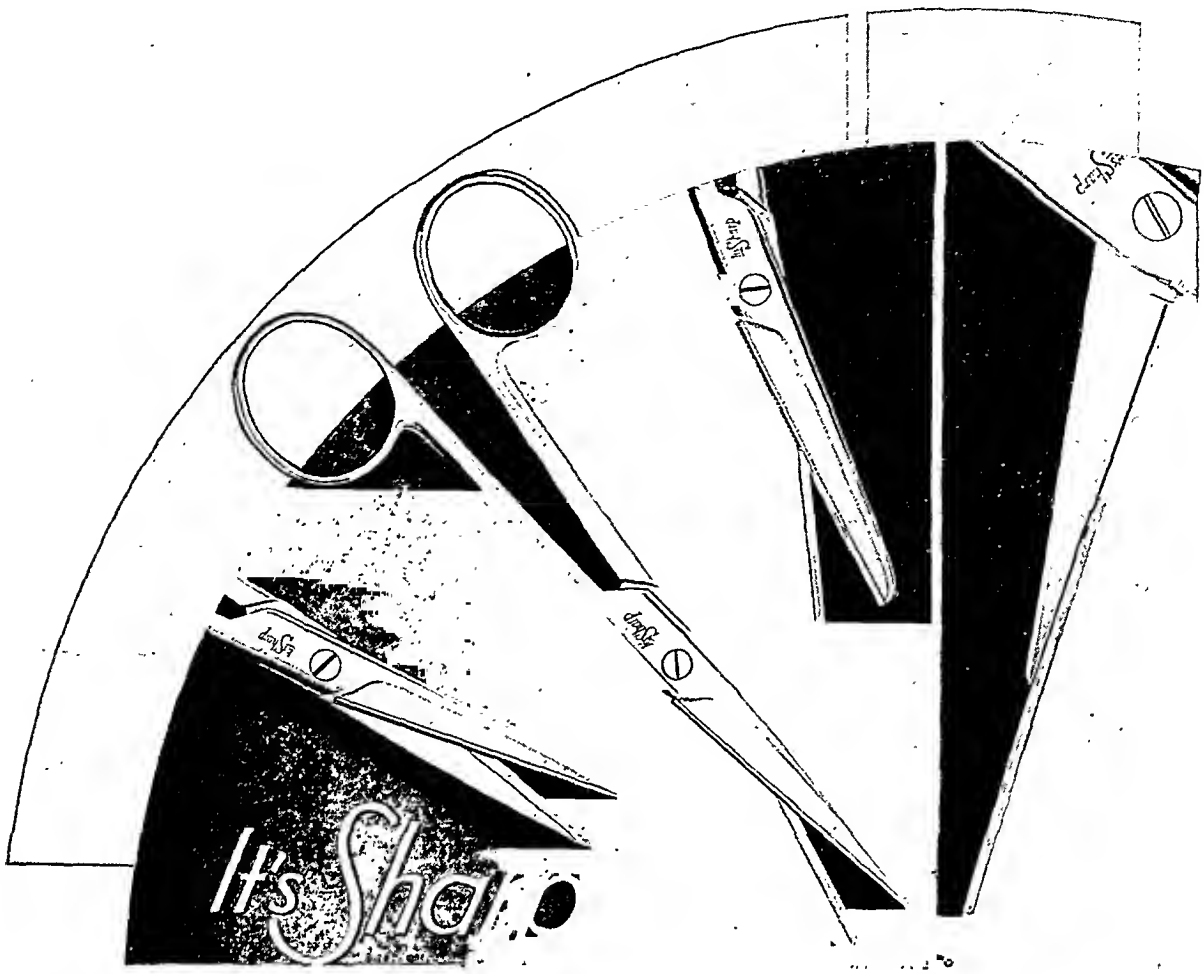
Made in Canada since 1883

AGAROL

FOR CONSTIPATION

"FOR better results"—is the watchword in producing Agarol. A mineral oil emulsion of highest grade ingredients obtainable, prepared with the efficiency of seasoned experience, cannot but be dependable. Its effectiveness is a reliable aid in teaching the intestinal tract to "keep hours," its exceptional palatability makes the taking of medicine easy and reasonably pleasant. §Agarol is the original mineral oil and agar-agar emulsion with phenolphthalein. It contains no artificial flavoring, no sugar, alcohol, or alkali. Trial supply gladly sent on request.

William R. Warner & Co. Ltd., 727 King St., West, Toronto, Ont.



SHARPER SURGICAL SCISSORS WITHOUT REGRINDING

CONSTANT regrinding of your scissors eventually destroys them. Why not eliminate it? BARD-PARKER RENEWABLE EDGE SCISSORS require no regrinding. Dulled edges are quickly replaced with new keen edges at 16⅔ cents per pair against a much higher average regrinding cost for other scissors.

Bard-Parker Scissors practically eliminate scissors replacements. Since they are not subject to grinding wear, they last indefinitely saving you many times over the cost of replacing scissors worn out by repeated grindings.

Bard-Parker Scissors facilitate operating technique because the edges are uniformly sharp. This is seldom true of reground scissors.

We believe that Bard-Parker Renewable Edge Scissors will give you greater economy and efficiency. Why not ask your dealer to show you a pair or write for further particulars?

Left: Bard-Parker Renewable Edge Scissors, 5½" Operating, Straight, showing three styles of points.

Above: Renewable edge partly removed from scissors.

BARD-PARKER RENEWABLE EDGE SCISSORS
Stainless Steel
NOW AVAILABLE

5½" Dissecting, Straight, Mayo type
6¾" Dissecting, Straight, Mayo type
5½" Operating, Straight, S & B
5½" Operating, Straight, S & S
½" Operating, Straight, B & B

BARD-PARKER COMPANY, INC.
369 LEXINGTON AVENUE, NEW YORK, N. Y.

A BARD-PARKER PRODUCT

A resume of the findings on bran during 1932

THE past year has added many new facts to the seientific knowledge of bran. Its effeetiveness as a laxative food for the correction of common constipation has been established (1).

Biological tests indicate that bran will not damage the tissues of the normal alimentary tract (2). These investigations show that bran provides "bulk" to exercise the intestines, and that this "bulk" is mueh like that of leafy vegetables. They further demonstrate that the laxative effect of the bran is not reduced by use over a period of time.

Laboratory measurements (3) have proved that bran is a good souree of vitamin B, and that it is rich in available food-iron for hemoglobin regeneration (4).

Bran at its best

Special processes of eooking, flavoring and crumbling make Kellogg's ALL-BRAN finer, softer, more palatable. Its action is mild. Within the body, it absorbs a great deal of moisture, and forms a soft mass, which gently elears out the intestinal wastes.

Exeept in cases of individuals who suffer from intestinal conditions where "bulk" of this kind would be eontraindicated, Kellogg's ALL-BRAN may be safely prescribed.

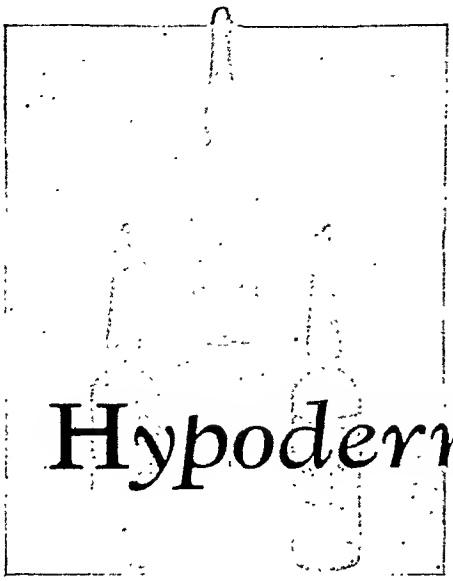
This delicious ready-to-eat cereal may be served with milk or cream, or cooked into muffins, breads, omelets—affording pleasing variety in menus. Appetizing reeipes on the red-and-green paekage. At all groeers. Made by Kellogg in London.

(1) *Laxative effects of Wheat Bran and "Washed Bran" in Healthy Men*, by Cowgill and Anderson, pages 1866-1875, J. Am. Med. Ass'n, May 28, 1932.

(2) *The Influence of Bran on the Alimentary Tract*, by Rose, MacLeod, Vahlteich, Funnell and Newton, pages 133-156, J. Am. Dietetic Ass'n, July, 1932.

(3) *Wheat Bran as a Source of Vitamin B*, by Rose, Vahlteich, Funnell and MacLeod, pages 369-374, J. Am. Dietetic Ass'n, March, 1932.

(4) *Factors in Food Influencing Hemoglobin Regeneration*, by Rose and Vahlteich, pages 593-608, J. Biological Chem., June, 1932.



Hypodermic Medication in "COLDS"

Colds are most likely to occur in persons with a lowered resistance.

If in the early stage the resistance powers of the body are activated, the duration of catarrhs of the nose and throat is shortened, the severity of the symptoms greatly diminished and complications prevented.

Non-specific proteins stimulate the defensive forces, but their injection is often attended with shock and other unpleasant reactions.

Omnadin—a combination of proteins and lipoids originated by Professor Much—has been found to produce a more complete and effective non-specific immunization. Moreover, the injections are virtually painless, and usually they are followed by a reduction of febrile temperatures. Recovery is hastened and extension of the inflammation to the nasal sinuses is much less likely to occur or to progress.

Other Indications

Omnadin has proved serviceable in other infectious diseases. Among these are influenza, pneumonia, erysipelas, boils, sepsis, gonorrhea, arthritis, infections of the eye, ear, nose and throat.

Manner of Use

Omnadin is administered intramuscularly as early as possible in the course of the disease. The average single dose for children is 1 to 2 cc. and for adults 2cc. One injection daily generally suffices.

Pamphlet on request

OMNADIN

Registered Trade Mark
Brand of PROLIPIN

Shockless Lipo-Protein Therapy

Ampules of 2 cc.
(Boxes of 5 and 100)

WINTHROP CHEMICAL COMPANY, Inc.
907 Elliott Street, West Windsor, Ont.